



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

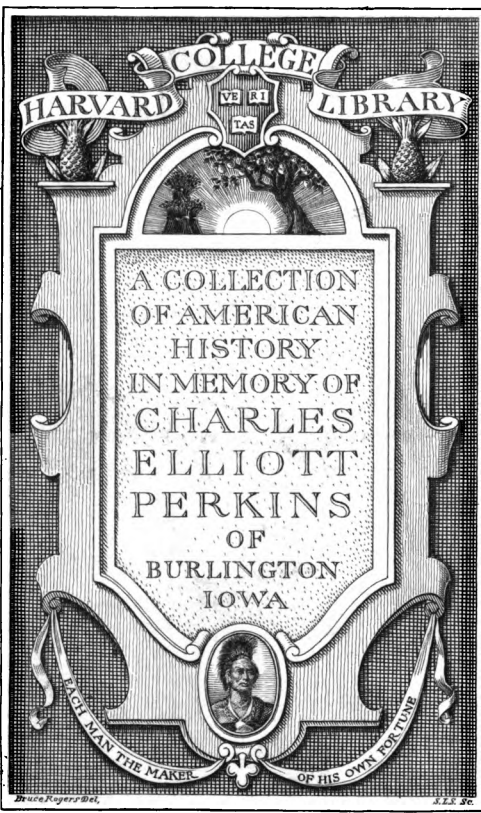
Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>



A description of Texas

Oran Milo Roberts

05 22 738.81



THE GIFT OF HIS DAUGHTER

ALICE FORBES PERKINS HOOPER

Cover



ORAN M. ROBERTS.

Imperfect:—plates are missing.

A DESCRIPTION OF TEXAS,
ITS ADVANTAGES AND RESOURCES,
—WITH—
SOME ACCOUNT OF THEIR DEVELOPMENT,
PAST, PRESENT AND FUTURE.

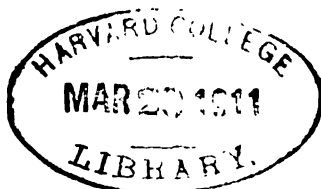
Q.—“ *A plain tale you’ve told,—
Very plain to be written ?*”

A.—“ *Yes, indeed it is,—when written.*”

—BY—
O. M. ROBERTS,
PRESENT GOVERNOR OF TEXAS.

ST. LOUIS, MO.:
GILBERT BOOK CO.,
1881.

U S 22738.81



C. E. Perkins memorial

Entered according to Act of Congress, in the year 1881,
By THE GILBERT BOOK Co.
In the Office of the Librarian of Congress at Washington.

DEDICATION.

This little work is respectfully dedicated to the Texan farmers, upon whose labors, rightly directed, the material prosperity of Texas must largely depend, and whose intelligence and integrity in public affairs must be relied on to sustain good government in this country; on the principle that the civilization capable of republican, local self-government begins and ends with the plow.

THE AUTHOR.

PREFACE.

AUSTIN, TEXAS, August 10th, 1881.

TO THE PUBLISHER:—

You request me to write some personal reminiscences as a preface or introduction to the work which you are publishing for me.

Nothing appears to me as being more appropriate than an explanation of how it happened that I, a small farmer, a lawyer and a judge, most of the time, during a residence of nearly forty years in Texas, should have collected the materials for such a work, while busily engaged in my ordinary pursuits. Having settled in San Augustine in eastern Texas in 1841, I entered upon my professional pursuits in the manner then common in the country. That was then the legal and political center of a large portion of the surrounding country. The district courts, (corresponding to the circuit courts in other states) were then held during the spring and fall months of the year. It was not unusual when the times for holding them arrived, to see a dozen lawyers with the judge, mount their horses, with saddle-bags, blanket, and tie-rope, and, thus equipped, start on their journey around the district, which then embraced many counties spreading over a large scope of country. As some of them would drop off, and not go around the whole circuit, others would fill their places, so that about an equal number of traveling lawyers joined to the local bar, would be met with at nearly every court. This mode of practice was kept up until the late civil war, after which the members of the bar became more and more localized in their practice.

At once adopting the habit of following the circuit in which I located, I traveled over a wide scope of country, from the Sabine to the Trinity Rivers, a distance of one hundred and fifty miles. We encountered the usual hardships of travel in a new and sparsely settled country, from rains and storms, often having to swim creeks and the shoals of rivers. Upon one occasion, being the youngest man in the party, I had the honor of being selected to swim the Neches River on horseback to bring over the ferry-boat from the opposite side, where it was fastened. On such trips we often met with Methodist itinerant preachers, going to or coming from conference, and we aided each other in crossing streams, they coming up on one side and we on the other. The universal hospitality of the settlers was a solacing relief to all of our fatigues of travel. Night or day their doors were thrown open, and a hearty welcome was given to share whatever they had, usually without money and without price. Their humble fare, seasoned with their unobtrusive kindness, was far more refreshing than the artistic dishes of modern hotels. I was never refused admittance for the night but once. Traveling with a young friend in a section of the country where the houses were from five to ten miles apart, just before dark, when a misting norther was just coming up, we called at a lone cabin and asked the man of the house to let us stay all night. He replied that he could not take us in, because his wife was sick. I answered that I could probably give assistance, having medicines along with me which I usually carried. He then said he had no feed for our horses. I replied that we could tie them up, and feed the next day; shelter from the coming storm was what we wanted. He answered, well, you can't stay. I asked him how far it was to the next house, and what about the road to get there. He said it was a plain road of six miles to the next house, where a Norwegian lived, that by taking a left-hand path just before we got to a creek, we could cross it just above the ford without swimming, as we would have to do if we crossed at the ford, and that we could reach the creek before it got full dark. We lost no time in getting to the creek and crossing it as directed; and putting on our blankets, and adjusting our baggage, not then being able to see our hands before us, we put our horses in the road side

by side, gave them the bridle-reins, and went in a sweeping trot the six miles, where we were hospitably entertained; and then for the first and only time in my life, I slept on one feather bed, with another for a covering.

At that early day there was much—much in the character and habits of the people of all classes and occupations;—much in the varied characteristics of the country, then seen almost in a state of Nature, being occupied only by villages and farms, small and far between each other,—much in the varied productions to the extent then exhibited,—much in the history and institutions of the country to arrest the attention and excite the investigations of an inquiring mind. The lawyers with whom I associated were, for the most part, men of great intellectual vigor, and of distinctive characters, no two of them being alike in their leading attributes. So with other citizens, a strong individuality and a general intelligence in common sense matters characterized them. Men of no class seemed to be built on any common pattern in anything, but each stood out for himself, a unit in the association of people here thrown together from different localities. There were men who had settled in the country as far back as 1822, and had passed through and participated in all of the revolutions that had transpired, some of them as officers in the army, and others as officers in civil life. Most of them were familiar with the stirring events of the past, and had leisure and willingness to freely communicate them. The old settlers knew each other often for hundreds of miles distant. Thus the opportunity was furnished to learn much of the past history, the institutions and the men of Texas.

Though the region of country over which I first traveled was small in extent, compared to all of the territory of Texas, it presented a great variety, in almost everything, in the different parts of it,—different in its soils, its growth of trees shrubs, vines, and grasses, as well as in its streams of water, its farm, garden and orchard products. Having some learning in the natural sciences, I very soon began to notice and fix in my mind the facts constituting those marked differences, and, without any specific object in so doing, commenced to investigate the reasons therefor. In a few years my business led me to extend these researches from Red River to the Gulf

coast, and as far west as Fort Worth and Austin, and afterwards to San Antonio in the west. Throughout all the country over which I passed I discovered these differences, in the condition of things in different sections, to have largely increased, which furnished a still wider field for my investigation. To this was added the reading of everything I could find, and conversations with well-informed persons, calculated to give me information about other sections of the state over which I had not traveled. One very great advantage of traveling over the country then, was, that it was done on horseback, or in stages, which gave much greater opportunities for observing all of the peculiarities of the different sections of the country, than the present mode of traveling by railroads. There never having been, as yet, but a very limited geological survey, or, indeed, a survey of any kind, by which accurate information could be obtained on many subjects treated of, I have had to rely, in this work, on the best information that I could otherwise obtain.

Having collected and preserved many facts pertaining to Texas, and being engaged in teaching a law class in the years of 1868, 1869, and 1870, I delivered to the students occasional lectures, embracing much of what is here presented, with a view to give those young gentlemen a good general knowledge of the varied characteristics and vast resources of the state in which they expected to spend their lives. Since then it has been put in the present shape, and is now published to give such general information as it contains, and especially to stimulate others, who may have more time and better opportunities, to correct whatever may have been wrongfully presented, and to give a more exact and extensive view of the extraordinary qualities and vast resources of Texas.

THE AUTHOR.

TABLE OF CONTENTS.

CHAPTER I.—DELAY IN SETTLING.

Causes of the delay in settling Texas. Want of ports of entry favorable to the landing of civilized immigrants from Europe. Remoteness from the Centres of Civilization, in Mexico and United States.

Labor the Source of National Wealth.

Causes of delay in developing its material industries. Inhabited by tribes of Indians, then by Mexicans; and then by Anglo-Americans under unfavorable circumstances.

Rapid progress after annexation to the United States.

The great loss from the result of the civil war. To individual, more than to national wealth, dependent upon the investment of surplus labor in slaves set free. The precarious condition of a peculiar property, held at the will of public opinion.

A partial enumeration of the great and varied resources of Texas; adequate for an empire,—a stimulus to elevate her people.

Land donations, and other benefits conferred, to encourage immigration, production, commerce and education.

Stands on a surer foundation than ever before, in respect to individual prosperity.

CHAPTER II.—PHYSICAL GEOGRAPHY.

Its position in the continent, its relations to the Gulf of Mexico, the Rocky and Alleghany ledges of mountains, the Mississippi river and valley, and to the great plains of the west; the influence of all these upon the climate of the different parts of Texas.

The dryness and warmth of the west, and the moisture of the east, explained; the isothermal lines indicated.

The droughts; two rainy seasons; and also the northers, with their causes and effects.

The principal elements of production; moisture, heat, pulverization capacity, and mineral fertilization of the soil, appropriately combined; each of the four giving character to the four grand natural divisions of Texas—with the peculiar effects of each there manifested in its productions.

Prairies and heavy forests, with the causes that produced them.

The value, as a portion of the national wealth, of Texas, of its virgin soils and subsoils, and a mode of approximately estimating them.

The study of the various peculiarities of each section lays the foundation for a general knowledge on the subject of production, upon which the prosperity of Texas greatly depends.

CHAPTER III.—GREAT VARIETY OF PRODUCTIONS.

Great variety of natural and artificial productions exhibited in passing through Texas on a line from east to west, and from south to north, and its extent in latitude and longitude.

Its division by regular belts of country, with the characteristics of each; the Level Gulf prairie belt; the Long-leaf Pine belt; the Magnolia belt; the Red-Land belt; the Black Jack belt; the Short-leaf Pine district; the Black, Limy Prairie belt; the Mountains and Cross-timbers; the High Grazing Plains and Valleys; the Staked Plain. "*Llano Estacado*."

The effects upon bottom lands of rivers that flow from and through these belts.

CHAPTER IV.—COMPARISON OF THE DIFFERENT BELTS.

A comparison of the different belts of country, with reference to the productions in each, and with the reasons therefor.

The tendency to increase the fruit-bearing in trees and crops, as the wood-producing capacity diminishes, and to what extent, as exhibited in the different belts of country that are found in Texas.

Bottom lands in Texas. How they are formed, and the different kinds in the different rivers and other streams in Texas. Their qualities, and how they may, or may not, be redeemed from overflows. When overflows are necessary, and when not to preserve their fertility.

Benefits of generalization and classification in the description of a country.

CHAPTER V.—NATURAL SOURCES OF WEALTH.

Natural sources of wealth in Texas in its minerals and timbers; and trees, shrubs, plants and flowers, as objects of utility and ornament.

Coal and coal oil. A vein of lignite from the Sabine River to the Rio Grande and coal in different places.

Copper in northern Texas. Gold and silver—the tradition concerning them, &c. Iron abounding in the east and found in the west. Rocks for buildings, fences, and other purposes, found in almost every region.

Gypsum, clay, marl and sand.

Fertility of soil largely dependent on character of the sub-soils,—interesting exceptions in parts of eastern Texas and the reason therefor.

Wood and fencing. Post-oak—the great fencing timber of the prairies, &c. Red-oak and Black-oak in the east. Cedar—its localities and use for fencing. Pine timber in south-eastern Texas,—its amount and the advantages connected with it. Cypress-timber in same locality. Hickory and white-oak in the east for wagons and carriages. Bois D'Arc timber in northern Texas its uses and value. Live-oak of the south and west, its boundary and extent. Pecan, its locality and value. Musquite of the prairies.

Hedges great profit of must be made of a plant or shrub. The Prickly Pear its uses as a hedge and otherwise. The Pappaw and persimmon—their uses. Other trees, plants and flowers.

Cordage—Bear grass in eastern and middle Texas good for ropes, &c., its uses. Medicinal trees and plants, large number specified. Wood-growing—the China tree and tree of Paradise. The valuable lessons taught by the forests of a country.

CHAPTER VI.—NATURAL WEALTH AS FOUND IN ITS WATERS.

The natural wealth of Texas, as found in its waters. For common use—their quality in different parts of the country. Mineral waters of medicinal virtues. The sour lake, and Lampassas springs, &c. Salines in the east and in the west. Water power—very great in the west and some in the east. For navigation—extent and character of. Coast canal—its advantages and practicability. For fish, oysters, &c., very good.

Wild game. Buffalo and Elk disappeared. Deer, Turkeys, Prairie hens, Partridges, &c., Bears, Panthers, Wolves, &c., determine the natural fertility of a country—the reason. Other animals, and some beautiful birds.

Atmospheric benefits—in wind power, in health, in production of crops, and in increased capacity to labor physically and intellectually.

Canes and reeds, as food for stock and for market particularly in the south and east.

Grasses. For natural pastures. The musquite grass in the west; the milo grass in the east, and others. Why pasturage is so beneficial to a country, how it may be secured, and the immense profit it is and has been to western Texas. The reason why dry countries are the best for grazing. The pests of Texas.—Cotton worms, grasshoppers, &c.

CHAPTER VII.—CULTIVATION OF CROPS.

Modes of cultivation of crops in Texas to obtain the advantages, and to relieve against the disadvantages, peculiar to the Texas climates and soils. Periods of the growth of different crops. How the excessive wet of spring and dryness of summer are to be guarded against.

The late frosts, their causes and effects, and how relieved against both in crops and orchard fruits. Some examples of successful farming in raising corn, cotton and potatoes, and the principles evolved therefrom. Adaptation of the different parts of the state to different crops and orchard fruits.

Orchards, their value and adaptation to, and mode of planting, pruning, and cultivating with the soils best adapted to them, and how the disadvantages of each section are to be remedied, and advantages of our climate turned to profit. Grapes, native and cultivated in different parts, adaptation to, uses of.

Horses and cattle, modes of raising in the past and present. Arts of horsemanship and of throwing the rope, necessary accomplishment, how attained and performed. Mexican saddle.

Swine. Modes of raising, past and present. Managed with hog-dogs, and how. Dependence on the masts, and how benefits obtained. Improved stock.

Sheep. Large section adapted to,—adaptation established. Profits of their best locality in a delightful country.

CHAPTER VIII.—MODES OF TRAVEL.

Modes of transportation and travel—past and present,—in Texas.

Trains of pack mules, how managed.

Wagons, and horse and ox teams, how managed. The great benefits of the ox teams to Texas, in cheapness of cost and expense.

CHAPTER VIII.—MODES OF TRAVEL.—CONCLUDED.

The two-horse wagons introduced since the war, and why.

Travel on horseback, in stages, and in private carriages and buggies,—rough roads.

Railroads—their extent and sudden construction, their great and varied advantages to Texas at present, and glowing prospects in the future. Must be the common mode of transportation throughout the civilized world, and why.

Steam-power and telegraph revolutionizing the industrial pursuits, and consequently the moral, social and political status of mankind, and raising them to a higher plane of civilization. Other anterior stages considered with their moving causes; discoveries of use of metals, gunpowder and printing press. The mainspring of civilization developed.

Manufactories—advantages of, and prospect of increasing, &c.

Individual wealth—modes of honorably acquiring it in Texas heretofore and now.

CHAPTER I.

CAUSES OF THE DELAY IN SETTLING TEXAS.

Causes of the delay in settling Texas. Want of ports of entry favorable to the landing of civilized immigrants from Europe. Remoteness from the Centres of Civilization, in Mexico and United States.

Labor the Source of National Wealth.

Causes of delay in developing its material industries. Inhabited by tribes of Indians, then by Mexicans; and then by Anglo-Americans under unfavorable circumstances.

Rapid progress after annexation to the United States.

The great loss from the result of the civil war. To individual, more than to national wealth, dependent upon the investment of surplus labor in slaves set free. The precarious condition of a peculiar property, held at the will of public opinion.

A partial enumeration of the great and varied resources of Texas; adequate for an empire,—a stimulus to elevate her people.

Land donations, and other benefits conferred, to encourage immigration, production, commerce and education.

Stands on a surer foundation than ever before, in respect to individual prosperity.

Texas is a country of remarkable characteristics. Its varied resources are adequate to a self-sustaining empire. It embraces within its borders all of the productions of the temperate zone, and some of those of the tropics. It has almost every variety of fertile soils, of valuable timbers, minerals, waters and climates (except the permanently cold). It has a vast plain, resting on the Gulf of Mexico, and extending from the coast to the base of the mountains, and cross-timbers, at an altitude of about six hundred feet; above which rises rapidly rugged hills, and broad prairie plains, traversed by rich valleys, ascending north-westwardly to the "Staked Plain," which is a table-land, about four thousand feet high, connected with the Rocky mountains. In every part of its broad area there lies some source of wealth, and often many of them, awaiting the touch of labor to spring into form and value.

Why, then, it may well be asked, has Texas so long remained a new country, sparsely settled, and but little devel-

oped? It is not because it was so long unknown, for San Antonio and, perhaps, also, Nacogdoches, were settled in the early part of the last century, the same year that Philadelphia was founded. These towns were merely military out-posts of occupation, for a hundred years or more, with very few settlements around them. A reason for the long deferred settlement of this country is found in the fact, that there was no good port of entry on the Gulf Coast, from the mouth of the Mississippi River to Vera Cruz, which includes our whole sea front. Civilization was imported into America in immigrant ships from Europe, that naturally sought good ports of entry for landing, from which the foreign population was spread out in the interior, and the savages driven back. Thus, while the shores of the Atlantic were teeming with a civilized population on one side, and great cities were rising up over the central part of Mexico on the other, the Texas coast furnished a hiding place for pirates and freebooters, and her broad plains were roamed over, for the most part, by the Comanches and other savage tribes of native Indians.

Texas has, therefore, ever heretofore been a country remote from the centers of civilization, equally so when part of Mexico, while an independent Republic, and when part of the United States.

Another reason for the long deferred development of Texas is found in the character, habits and condition of the people, who have, from time to time, inhabited it.

That this may be properly appreciated, it must be premised, that labor is the foundation of property, which, whatever its species, form or value, over and above the bounties of nature, is but the result, the fruit and representative of so much labor. Permanent national wealth is, for the most part, the current values of labor, fixed upon the earth in the shape of profitable improvements perpetuated so as to produce values, for the present and future generations. Thus, we may say, that Great Britain has within it a hundred millions of people at work now, though more than two-thirds of them are dead. Their labor, while living, was perpetuated in accumulated and solid shape, and is now producing values, in aid of those who are now living there.

For centuries Texas was the home of the roving Comanches, and other savage tribes of Indians. They neither plowed nor built, and perpetuated no labor for their posterity. The grand-sire and grand-son went through the same round of undivided labor, which was mainly to hunt something to eat, steal horses, and to kill their enemies. Being expelled, they have left behind them no vestige of their long occupation, except that which is to be found in the names of a few mountain peaks and water-courses. They are careful, however, to keep us reminded of their existence, by their savage depredations upon our frontier people. This, however, cannot last long; for this very savage nature, which causes them to strike back as they recede before a superior race, draws upon them their gradual, though ultimate, extermination. This is simply one of the processes at work, by which the higher order of man is, and will continue to be, forced in self-defence, willing or not, to take possession of, and use the earth everywhere, carrying out the inexorable and perpetually operating law of races, and of nations,—to elevate or die. Give the Comanche his horse, his bow, his buffalo meat, and his pecans, and all else,—clothes, houses, farms, cattle, railroads, factories, ships, cannons, are to him but “Vanity and vexation of Spirit.”

A characteristic remark is reported of a Comanche chief who was taken to Washington City, and there shown the works and wonders of civilization. He said, in substance, that he was not surprised that white men could make all such things, but the wonder with him was, how they first could think of wanting them.

The Mexicans during a hundred years, under the Spanish monarchy, and afterwards under the Mexican Republic, made some progress in settling a small part of Texas, and in disputing its dominion with the Comanches and other tribes. They were, for the most part, a race of native Indians of copper color, slightly intermixed with Spanish blood. They were partial, in their industrial pursuits, to hunting for game, and to the care of herds of cattle, sheep and horses; and their arts were, in the main, confined to a level with their occupations. Their cultivation of the earth was very limited in

quantity, and rude in manner. Their mode of developing a new country was by laying off a town with a large tract of land around it for commons, establishing therein a military post and a Catholic church, and inviting settlers to the town, by giving them lots therein, and lands in large tracts in the surrounding country for the establishment of stock farms, that were the abodes of the herdsmen, who, as occasion might require, took protection in the town under the military, and also paid their visits there for religious devotion with the priest. And the town was also the center of attraction for their dances, cock and bull-fights, when the town arrived at such proportions as to afford the luxury of these amusements.

With their standard of manhood, and arts of war, the struggle with the wild savages was long, and often doubtful in maintaining their position in the country. That difficulty, perhaps, contributed largely to their invitation of the Anglo-Americans to share with them their lands and dangers; which, commencing formally in 1821, resulted in establishing numerous colonies for the settlement of white men.

The antagonism of races soon commenced, and was kept up from various grounds, until the Anglo-Americans, by the aid of some noble Mexicans, remained masters of the field, and established in Texas an independent Republic in 1836.

The Mexicans are now reduced to small numbers in a few localities. They have left behind them one stone-house in eastern Texas; (at Nacogdoches, which is there called "the stone-house") one town in western Texas, San Antonio, now a delightful city, the Bagdad of America; also in the west, the wreck of some stone-built Missions of the olden time, and one mule path, called formerly the "King's highway," which may yet be traced, by its deep, narrow beaten track in many places, between the Sabine River and the Rio Grande. It runs by San Augustine and Nacogdoches, and by Bastrop and San Antonio, and has been used to designate the boundaries of Colonial grants by the former governments. [See Map I.] They have left with us the art of throwing a rope in catching animals, and some other arts of stock raising and training, including their saddle-trees, spurs, hats, and quirts. They

have left their names of rivers, and creeks, and of some counties and towns. They have left their land measures, such as varas, labors, and leagues, their land-titles, marital rights, in modified form, and other laws, most of which they derived from the Spanish Civil Law. And they have left, lingering in the memory of many an old Texan, the universal Christian charity and humanity of the Mexican women, who were ever ready to feed, to comfort, and to plead for mercy towards the Texan prisoner in time of war.

The Anglo-Americans, when permitted to come to Texas, as colonists, and otherwise, adopted a very different mode of settling a new country. They went out boldly, spreading themselves over the country, irrespective of military posts, or priests, or towns, and with guns in hand, confronted the dangers of the Indian scalping knife and tomahawk; formed settlements, built cabins, opened and tilled farms, and gathered around them their stocks of hogs, sheep, cattle and horses. Towns arose, as incidental to their settlements, as trade and commerce required, and not as the primary object, as was the case in the Mexican plan. Churches and school-houses were erected in the settlements and towns, and a different order of civilization dawned upon the fair face of Texas; agriculture, being, as it has always been everywhere, the foundation and mainspring of all elevated civilization; because it fixes upon the earth and perpetuates labor more permanently than any other mode of life; and makes it necessary to build roads, open rivers, erect towns, promote commerce, and ultimately manufactories; all of which accumulate and perpetuate labor in some shape or other for future use.

Notwithstanding this change, however, but little progress was made in substantial material development, until the annexation of Texas to the United States; for two reasons: first, because most of the early settlers occupied themselves in acquiring lands, rather than in improving them; and, secondly, because property was not sufficiently secured to encourage the investment of great labor upon it.

For fifteen years, from annexation to the commencement of the late civil war in 1861, the material development of

Texas was indeed very great. During that period there was a large influx of population and wealth, mostly in the shape of slave-labor. Forests fell, prairies were plowed up, dwellings, gin-houses, mills, sugar-houses, churches, school-houses, villages, towns, and cities, all sprung up, as if by magic; and the lively energy of the new-comer infused increased force and activity in the habits of the old settler, or drove him to the frontier to take care of his vast herds of cattle and horses. The two races, white and black, worked together in harmony, the relative status being fixed by law, and by traditional custom. The superior directed and took care of the inferior. Bounteous crops sprang from the virgin soil, and general prosperity gladdened the land, strewing peace and plenty broadcast over the whole country.

A vast amount of the labor that had been accumulated and perpetuated, and constituted individual and national wealth up to the end of that period, was lost by the freedom of the negroes at the end of the war. To understand the full force of this remark, it must be considered, that the Southern people, for a century and a half previously, had been largely investing their surplus earnings from labor of all sorts in negro slaves; that after the cessation of the African slave trade, (which was about 1808,) and after the full operation of the prospective emancipation laws of the Northern States, which sent their slaves down upon us to be purchased, the increase of that sort of labor could only be supplied by natural increase. Hence, a gradual increase in the price of it began and continued, so that the same sort of a negro slave that was worth from \$150 to \$250 in 1808, was worth from \$1000 to \$1500 in 1860. A farm stocked with negroes was a safe investment, and managed with but little money-making ability; and for that reason, as well as from confirmed habit, capital and industry sought continually that direction. This investment worked in a circle, ending in procuring more and more labor by the purchase of more slaves; which was usually the measure in estimating individual wealth. But little was left from this process of accumulation, for permanent improvements, either by separate or co-operative industries. The investment in slaves was generally greater in amount

than that in houses, farms, or other permanent improvements. While the people of the North, during the present century, were receiving thousands of able-bodied laboring immigrants from Europe annually, whom they had not raised, or bought, (which was the same as millions of money cast upon them by donation,) and while they, with such aid, were opening canals, rivers and harbors, building railroads, ships, factories, and colleges, and making fine farms and farm residences, rearing great cities, and thereby fastening upon the soil, and perpetuating for the use of future generations their surplus labor, the people of the South were tramping around the circle of the tread-mill,—buying more slaves, (increasing in price,) to make more sugar, cotton, rice, and tobacco, and making more of these things to buy more slaves;—until their slaves represented perhaps one-half of the piled-up and perpetuated labor of themselves and ancestors for one hundred and fifty years; the whole of which wealth, as to them individually, a blast of breath from the North blew away as chaff. They had invested their surplus labor upon the foundation of the stability of public opinion in a Republic, and lost it; whereas, had it been placed in valuable improvements, fixed upon the soil, they, individually, might have become bankrupt, and their labor still have been preserved as national wealth. The loss to national wealth is not so great as to individual, because the negroes are still left as laborers. Being less efficiently directed, much that had been attained in agricultural improvements has gone to waste for the want of sufficient labor.

While the views here presented will enable it to be understood why Texas had made no greater advance in the permanent improvements, common to other countries differently situated, they will serve to prepare the way for a comprehension of the condition of things in Texas, under the new era of industrial pursuits, as well as of public affairs, upon which we have entered since the war.

We have now fairly entered upon the experiment of two races of people, as different as white and black, living together in the same country, upon recognized terms of legal and political equality, and with the same inequality, in the

personal and social relations, and in all matters outside of the law as it existed formerly, while the blacks were slaves and the whites masters. It is well that it is so, and is likely so to continue in Texas; not as matter of prejudice, but as matter of humane policy. No two such distinct races ever did, or ever can be reasonably expected to live together, on terms of perfect equality in every respect, otherwise than upon the miraculous supposition that they respectively could regard each other as truly and exactly equal in every respect. It is likely to continue as it is here, because hundreds of thousands of white people, from the other states and from Europe, are pouring into Texas, by which the importance of the blacks, as a class, either for labor or otherwise, is diminishing day by day; and in a few years they will be relatively lost amidst the busy millions of whites that will spread themselves over our broad domain. We have advanced far enough, in the first ten years since the negroes were freed, to perceive a most marked change in the direction of our industrial pursuits, in our habits of life, and in the general face of society. The industry of the whites has been quickened, and better directed towards comfort and utility in the country, as well as in the towns. Country residences and pursuits are less desired than formerly, and are sought and used more as an employment, and less as an investment. The greater number of heads of families have added immensely to trade and commerce, by which towns and cities have grown rapidly, attracting more and more the population and capital of the country. More rail-roads and other public works have come into existence. We are learning the advantages of co-operative labor, skill, and capital. Already we are beginning to fasten upon the soil, in more permanent shape, the surplus earnings of labor, and necessarily to call into requisition more of the varied resources of our country, which have as yet but only commenced to be discovered and developed. It is only by approximate comparison that we can begin to appreciate the vast resources of Texas. She has a sugar and sea-island cotton region, as large as those of Louisiana; a cotton region as large as Alabama; a wheat region as large as Ohio, that can put flour in the market a month sooner; a grazing region

(that sends out fat beef and mutton in the dead of winter) seven hundred miles long, and over two hundred miles wide. Indian corn, field and garden vegetables are produced well in most parts of Texas. In nearly every part some sorts of orchard fruits and grapes grow finely, embracing oranges, figs, peaches, pears, plums, apples, and both native and foreign grapes. It has considerable sections of country well adapted to rice, Cuba-tobacco, and common tobacco. It has an area equal to one hundred miles square of long-leaf pine, and considerable quantities of short leaf pine, and also a great quantity of valuable forest trees for timber, for fencing, building and machinery, and furniture.

She has in different parts of the State large quantities of rock, for building, for lime and other purposes. She abounds in iron and other valuable minerals. She has probably the largest gypsum bed in the world, and lignite and stone-coal in abundance.

Her gulf coast and rivers abound in fine fish. In the extreme west, where the dryness of the climate renders cropping precarious, there are bold mountain streams for irrigation. We have a generally temperate climate, subject to considerable diversity, and, though changeable, it is generally healthful, and agreeable, and in some portions of the State extremely so.

Our condition is rapidly being changed in another important respect. Instead of a remote country (the "*Province of Texas*," at one time, and part of the *Trans-Mississippi Department* at another) it is getting to be in the direct passage of the commerce of the great north-west to the Gulf, and before long may be traversed by two great high-ways to the Pacific Coast, over which must pass some of the most precious productions in the commerce of the world.

It is said that a country makes the people. If so, it must be because its resources appeal to them for development, and shape and limit their character. Upon this standard of progress, the people of Texas have a grand field of operations, a Herculean task in the mastery of it, and a great future in prospect for realization.

The governments, under which Texas has existed, have

done much to encourage the increase of its population, the settlement, and the development of the resources of the country. By the general colonization law of Mexico of 1824, a league of land (4428 acres) was granted to settlers. The Republic of Texas increased it to a league and labor (4506 acres). From that time to the present, donations of land to actual settlers have almost continually been made, in different quantities, (1280, 640, 320, 160 acres), the last of which is still given as pre-emptions (160 acres). Since annexation to the United States the Legislature has appropriated money and lands to clear out and improve the navigation of the rivers, and has chartered numerous railroads, giving them a liberal bounty in lands (usually 16 sections to the mile), and has loaned to some of them, of the school fund, \$6,000 to the mile; has chartered numerous manufacturing and mining companies; and has lately given a bounty in lands to encourage irrigating canals. It also passed a law organizing and supporting a geological corps, for the discovery and exhibition of the agricultural, as well as of the mineral resources of the state, which is still in operation. It has caused to be built, near Bryon City, an agricultural and mechanical college, which has been put in operation. A general law has been passed for the institution and regulation of agricultural and mechanical associations. We have had, also, an Immigration Department, with its officers, which has lately been abolished.

As early as 1839, the Congress of the Republic of Texas donated fifty leagues of land to build two universities, which lands have been well located, and are valuable, to which one million of acres have since been added. At, and shortly after, the same time, four leagues of land were donated to each county for the building of an Academy in each, which lands have generally been well located.

In the donation of land to railroads provision was made for surveying and setting apart therewith, alternate sections for the support of a Common School System, which, if carefully managed, will produce at no distant day, a magnificent fund for that purpose.

With all these advantages, and resources, some of which have here been merely glanced at, rather than explained,

Texas, in all that concerns the secure and solid prosperity of its citizens, in their various industries, stands upon a firmer foundation than ever before, and with a government at home in harmony with the views and interests of the great mass of its people, it is now securely on the high-road to a glowing prosperity, commensurate with her great extent.

CHAPTER II.

PHYSICAL GEOGRAPHY OF TEXAS.

Its position in the continent, its relations to the Gulf of Mexico, the Rocky and Alleghany ledges of mountains, the Mississippi river and valley, and to the great plains of the west; the influence of all these upon the climate of the different parts of Texas.

The dryness and warmth of the west, and the moisture of the east, explained; the isothermal lines indicated.

The droughts; two rainy seasons; and also the northers, with their causes and effects.

The principal elements of production; moisture, heat, pulverization capacity, and mineral fertilization of the soil, appropriately combined; each of the four giving character to the four grand natural divisions of Texas—with the peculiar effects of each there manifested in its productions.

Prairies and heavy forests, with the causes that produced them.

The value, as a portion of the national wealth, of Texas, of its virgin soils and subsoils, and a mode of approximately estimating them.

The study of the various peculiarities of each section lays the foundation for a general knowledge on the subject of production, upon which the prosperity of Texas greatly depends.

The first thing to be learned about Texas, in order to understand its climate and productions, is its Physical Geography. This is dependent upon its central locality between the Atlantic and Pacific Oceans, its relation to the ranges of mountains on this continent, and the Mexican Gulf, and to the Mississippi valley and river.

The North American Continent exhibits a high continuous ledge of mountains, (from 6,000 to 16,000 feet high,) near the western edge, called the Rocky Mountains; with a vast expanse in their course from north to south, and a less elevated, and less expansive ledge, (from 2,000 to 6,000 feet high,) called the Alleghany or Appalachian chain of mountains near the eastern edge from north-east to south-west; leaving between them a trough-like depression constituting three great basins, to wit, that of the Mississippi valley, that of the great lakes, (Superior, Huron, Erie, &c.) and that of Hudson's Bay.

This is shown by the elevations in that trough above the level of the water of the Gulf, and Atlantic, as follows; at the mouth of the Arkansas on the Mississippi River it is 82 feet, at St. Louis 375 feet, and at the central part of the State of Ohio 1,000 feet; Lake Erie 565 feet, Lake Superior 623 feet; the land at the head of the Mississippi River 2,000 feet. That River runs from north to south, in the bottom of the southern portion of this trough, and is the dividing line, from which the ascent commences east and west, in forming the two great ledges of mountains of the continent.

Texas belongs to the elevation connected with the western ledge of mountains, and occupies the corner between the Gulf Basin and that of the Mississippi valley,—rising from both, by a double ascent, to the “Staked Plain” of the north-west, which is 4,000 feet high or over, and is itself but a spur of the Rocky Mountains in the shape of a high table plain, coming down from the region of Pike’s peak (about 13,000 feet high,) in Colorado. Up-the-Country in Texas is generally to the north-west, as indicated by most of its rivers, which rise up in, or in the direction of, the “Staked Plain,” and flow usually in a zigzag course towards the Mississippi River and to the Gulf, as may be plainly seen in the course of the Sabine, Trinity, Brazos and Colorado Rivers. Thus Texas is made to consist of high rolling, and often rugged, plains descending from the “Staked Plain,” south and east, to the “mountains” and “cross-timbers,” whose base is elevated about 600 feet above the Gulf; and of the western part of the great “Plain of the Gulf slope,” which extends from the Rio Grande to central Florida, and from Memphis and Little Rock to the Gulf; and which is the great cotton and sugar region of the United States.

This trough-like shape of the continent tends to diverge the course of the north-eastern surface-current of atmosphere, in the cycle of the temperate zone, and directs it northwardly in a deep, strong current, from the Gulf of Mexico up the deep valley of the Mississippi River, which direction is also aided by the valleys of the rivers west of the Mississippi, running south-east, up which the current presses in proportion to their depth and breadth.

This divergence of the atmospheric current makes our **dry**, hot winds of drought in summer appear to come from **due** south off of the Gulf; whereas, in fact, they come from **arid** regions west of the Gulf. Generally, however, this current of atmosphere carries the moisture of the Gulf (the direction of the range of Alleghany Mountains not impeding it,) **all** over the eastern portion of North America, (filling the great northern lakes,) and making it one of the best watered and most productive regions in the world, of the same vast extent. Let a line be drawn from about the western margin of the Gulf northward to the Arctic ocean, and all the country west of that line and the eastern ledges of the Rocky Mountains is a dry country, often approaching the condition of desert, mountains and plains, from which in its whole extent of 5,000 miles in length, and 1,000 miles in average breadth, the regular moisture is cut off by the snow mountains of Mexico. The regular north-east current of atmosphere from the Gulf misses it entirely, and the moisture from rain-fall of that vast portion of the continent is dependent upon the accidental and occasional drifts consequent upon atmospheric convulsions, and upon the periodic vacillation from east to west of the dividing line between the dry and the wet regions of the continent. (See Map No. 1.) This dividing line, running through Texas from south to north, and being changeable by moving to the east and to the west in different years, or period of years, causes the most of her territory to be affected by the peculiarities of each region in some measure at different and occasional periods. Hence, on both sides of that line for some distance we have periods of dry seasons, and others of wet seasons, just as the dry line, running north and south, may vacillate to the east or the west, from its accustomed location near the center of the state.

Still it may be said that the eastern portion of the state is safely within the well watered region, and the western portion, on the Rio Grande, is in the dry region. These plains, or prairies, being for the most part devoid of forests of wood, are rendered still more dry on that account, as they are thereby more readily

swept by the strong currents of wind from the south in the summer, and from the north-west in the winter. Their rapid ascent from the plain below, and their rolling and often abrupt outline, greatly tend to aid in keeping them dry by the facility of drainage.

By these various causes the lines of latitude that mark similar degrees of temperature (called isothermal lines,) do not, in Texas, correspond with the ordinary lines of latitude; but, on the contrary, after passing the middle of the state, in going westward, they turn north-west, by which the average summer heat of El Paso at 32 deg. N. L., on the Rio Grande, is as great (allowance being made for altitude,) as that at Brownsville, near the mouth of that river, which is only 26 deg., N. L. (See Map No. 1.)

These isothermal lines bear northward in going west, notwithstanding the increasing altitude, mainly perhaps on account of the increasing dryness of the atmosphere.

When we have in summer a strong continuous current of air sweeping over Texas from south-west to north-east, (apparently coming from the south usually,) we are almost certain to have a drought. And when in winter we have the slowly creeping warmth of the gulf stream, wafted north on the mainland from the gulf, so as to rarify the substratum of air, a norther breaks down suddenly from the high regions of the north-west, and sweeps down over all of our prairies, carrying in its course to the gulf the stagnant miasma of the interior, and leaving in its place a dry, cool exhilarating atmosphere. This excess of cold and heat, to which portions of the state are periodically subject, is much relieved by the dryness of the region most liable to it. For it is well known that the deleterious or disagreeable effects of either cold or heat, upon animal or vegetable life, are greatly diminished, and frequently entirely obviated by extreme dryness, and are proportionately increased by moisture.

Texas may be said to be a dry country in the main, though we have what may be called two rainy seasons in the year, one in the spring, and one in the fall. Had we a line of high mountains, ranging east and west along our northern border, we might calculate on having an abundance of rain

No extravagant extremes of heat or cold.

during all seasons of the year, as they have in North-Carolina and Virginia. For then the warm atmosphere teeming up from the gulf, freighted as it is with watery vapor which may be seen flying over us every morning in the dryest times, would meet with the cold air of the mountains, and cast down refreshing showers in summer. We have no such mountains, and, therefore, the watery vapors pass on northward until they reach the mountains of Arkansas, or Missouri, or still further, until they reach a latitude about the northern lakes, where the snow line above comes near enough to the surface to occasionally furnish the cold winds sufficient to produce rain, by which process the water of the Gulf is transferred to the northern lakes, and the country adjacent to them is furnished with good seasons. In the absence of such mountains, we must await the nearer approach of that snow line, driven down south towards us in the fall by winter, as it slowly creeps southward; and then in the spring the gushing heat of the tropics, moving northward, drives a deluge of watery vapor on our skies before the chill of receding winter has entirely escaped to its northern home, and thereby casts down superabundant rains, which fill the earth deeply with a supply of moisture for summer, and give a liberal surplus to swollen streams, that carry it back in haste to the Gulf.

Occasionally, also, (but seldom when we need it,) a three days' wind from the east transports to us a chilling supply of water from the Atlantic ocean.

Thus we have variety without any extravagant extremes in most of the territory of the state,—the heat of summer rarely exceeding 80 to 90 degrees, and the cold of winter never preventing out-door pleasure or labor for more than one to three days at a time; with a bright sunny sky over us nine-tenths of the year, and yet seasons sufficient to make labor highly remunerative in all parts of the country, when applied with proper discrimination, as to what each section is best adapted. This uniform moderate warmth, dryness and light of our sunny clime, not only tends to promote health and animation, but also gives to life a cheerful charm which old Texans can not fully appreciate, unless they should visit, particularly in the winter, some of those drizzly, dark, cold regions of the north-eastern portion of the continent.

To properly appreciate the adaptability of the different sections of Texas to their appropriate productions, it is necessary to understand something of the philosophy of vegetable productions, under the various conditions to which it is subject, in different parts of the country. It is evident that the natural productions are very variant, though each may be excellent of its kind, dependent upon permanent causes. In artificial production of crops, those causes and their effects should be understood so as to point the way to the safe investment of capital and labor. The causes that facilitate the growth of trees may prevent the growth and preservation of the grasses, and *vice versa*. That which produces wood-growth may not proportionally promote fruit-bearing on the wood. That which retards or kills growth in one place, fosters it in another. All these, and many more such phenomena, prevail in Texas, dependent upon permanent natural causes. Without going into any minute investigation at present, suffice it to say, that with all sorts of vegetation, and in all countries, its existence and growth depend upon the combination, and the respective portions in the combination at any one locality, of four leading elements of production which are *heat, moisture, pulverization capacity of the soil and mineral fertility of the soil and substratum of earth*.

These, in appropriate combination without excess or deficiency in any one, are the best possible conditions upon which excellent and durable production is attained. It often happens, however, that this is overlooked by the very superior excellence of one of these four qualities predominating in a locality, to such an extent, as to greatly relieve against a striking deficiency or excess in one or more of the other three. Very great deficiency or excess in either one, however, will usually prevent or destroy vegetation. A mountain of perpetual snow cannot produce, because of a deficiency of heat; whereas the deserts of Africa share the same fate from an excess of it. The same tropical heat in South America, where a refreshing shower of rain descends every day of summer, generates an exuberant growth of forests.

Vegetation cannot gain a fixed foot-hold in the wind-drifting sands of the desert plain owing to an excess of pulverization capacity, nor upon the hard rock, whatever may be its composition, from a deficiency of it. Excess of water prevents the chemical action in the earth which is necessary to furnish food for plants and trees, and a deficiency of it produces the same effect.

A good mineral fertilizer may be so in excess (as a bed of lime or gypsum, or ashes or sea-shell,) as to destroy or prevent vegetation. Indeed sameness in the ingredients of the soil and subsoil, of any sort, is inimical to the permanent growth of trees, as is strikingly illustrated in our deep, rich limy prairies of middle and northern Texas, as well as in our sand flats of eastern Texas. The greater the mixture of different ingredients in the earth, the more favorable is its condition for permanent production. Now, it so happens that each one of these elements of production is peculiarly predominant in four different sections of the state, and largely influences the production therein. Heat and dryness in the far west; moisture in the south and east; pulverization capacity of the soil in a belt of country, reaching from near the north-east corner of the state nearly to Corpus Christi, embracing most of the clay, sand-stone and iron-ore region of eastern, middle and southern Texas, the central portion of which may be designated by Gilmer, Tyler, Palestine, and thence south-west; mineral fertility of the soil and in the sub-soil abounds pre-eminently in all the black, limy prairies from Sherman and Clarksville in the north, to and beyond Austin in the west, and in all the rolling plains and valleys west of that line as far out as ordinary crops can be made. (See Map No. 2.)

The heat and dryness of the far west favor the growth and preservation of the grasses, and make it a vast grazing region that can well dispense with barns, or even with cutting and stacking, to preserve its hay. The moisture of the south and east are favorable to sugar, rice and cotton.

The pulverization capacity of the interior timbered country, previously indicated, is peculiarly favorable to an average production of most crops common to the south, including

corn, cotton, garden vegetables, orchards and vineyards. The mineral fertility of the black, limy prairie is peculiarly favorable to all of the cereals, as well as to cotton. Though the sections of country, subject each to these respective peculiarities, may not be marked out by any exact lines of boundary, and may often run into each other, and sometimes one partakes of the peculiar quality of the other; still the marked characteristic of each section, as described, stands out in bold relief, so as not to be mistaken, when attention is called to it, as will be seen more prominently hereafter. In estimating the probable effects of any of these elements of production the altitude of the locality must be taken into account, in as much as it may affect both the dryness and warmth. Thus cotton will grow to great perfection in the low regions of Mississippi and Arkansas on or near the 35th deg. N. L., near Memphis; whereas, near the same line of latitude in Alabama, Tennessee and Georgia in the high mountains it will scarcely mature at all. Indeed there is no certainty in its growth in an altitude over six hundred feet above the gulf, in any part of the south.

A few reflections may be here added profitably, as it is thought. And first, if we have found the necessary condition of things, in the production of the growth of trees and plants why may we not by a process of reasoning backwards from the fixed premises, account as readily for the absence of trees on prairies, deserts, sea-marshes, steppes and other places that are found without them, which has seemed to geologists, and to others, so difficult a problem? The rule, so far as it can be made into a set form of words, is, that in every prairie, desert or other place devoid of trees, or forests of trees, there is a deficiency or an excess of some one or more (usually several,) of these four elements of production, either permanently, or periodically, existing there to an extent sufficient to prevent their generation and growth.

It only requires a patient and searching investigation, upon the principles here suggested, to account for their existence everywhere they are found on the earth, whether of small or large area. Secondly, such is the variety of our productions, natural and artificial, and such is the variety of the causes

The wealth of Texas buried in her rich virgin soil.

either favorable or inimical to them in the different sections, that the study of them becomes the study of the industrial prosperity of the state in its great future. Thirdly, it may be well to contemplate, as what has gone before has prepared us to do, the national wealth of Texas, buried in her rich virgin soil, and floating in her salubrious atmosphere,—a gratuitous bounty of the Creator to its inhabitants. We would comprehend this much better, if each man owning an acre of land could dig down a few feet, and find his twenty, fifty, one hundred, or two hundred dollars of coined gold, there deposited for him. Still it is certainly there in the extra-fertility of the soil and subsoil, over all of the tillable portions of Texas, and over most of the grazing portions too, if he will only have the digging done in the right way.

Under every fertile soil, or soil that has been fertile, (with some occasional exceptions, not necessary now to be noticed,) there is a substratum of earth, or rock of some sort, that is a good mineral fertilizer, that receives the water through the surface from the winter and spring rains, and in response to the heat of the summer and fall, loads the ascending vapor with a mineral fertility that enriches the surface. This process is continuous wherever the surface-water returns in vapor from the bowels of the earth. It is a fertility that does not have to be purchased, as does guano, nor carted from the manure heap. It is by this process that worn out lands revive upon being turned out for a few years, and it is on account of the activity and certainty of this process, that some of our black, limy lands, under-laid by a white cretaceous limestone, cannot, it seems, be worn out. Texas abounds in rich mineral substrata of various sorts, such as lime and marls, both clay and shell marls, that ensure a durable fertility to its soils. That this may be made intelligible to any one, who may doubt it, let it be reduced to figures. What is it worth to make, by the use of fertilizers, a barren soil of sandy-loam or clay produce, per acre, 15 bushels of wheat, 40 bushels of corn, or 1,000 pounds of cotton, on an average, from year to year? It will take ten dollars annually. There are numerous farms in northern and middle Texas, on the black, limy land, that have produced a greater average than that,

for the last thirty years, without any manure ; and the straw or other stubble of the crops has been burned off every year to get clear of it ; still those lands produce with undiminished fertility. The amount loaned at safe interest, (say at ten per cent.) necessary to raise the ten dollars per acre, to be expended in manuring the barren land, is one hundred dollars ; and that is the amount that the Texan who owns an acre of black, stiff, limy soil, resting on a white cretaceous limestone, has imbedded in his land as a permanent agricultural investment. This will give some faint idea of the millions upon millions of permanent wealth that is now imbedded in the vast domain of Texas,—which is bounteous Nature's free gift to man,—provokingly awaiting the touch of labor to bring it forth, not as the transient wealth of the gold mine, but lasting from year to year, and from generation to generation, while the rains fall, and the sun shines, to put the earth in perpetual activity to produce it.

The minerals, the timbers, the native grasses, and various other objects in Texas, could be shown in the same way to possess immense values, as gifts of Nature, not worked for by man, but to be realized by, and in addition to his labor, when it is properly applied to them.

CHAPTER III.

GREAT VARIETY OF PRODUCTIONS.

Great variety of natural and artificial productions exhibited in passing through Texas on a line from east to west, and from south to north, and its extent in latitude and longitude.

Its division by regular belts of country, with the characteristics of each; the Level Gulf prairie belt; the Long-leaf Pine belt; the Magnolia belt; the Red-Land belt; the Black Jack belt; the Short-leaf Pine district; the Black, Limy Prairie belt; the Mountains and Cross-timbers; the High Grazing Plains and Valleys; the Staked Plain. "*Llano Estacado*."

The effects upon bottom lands of rivers that flow from and through these belts.

Of all the resources with which Texas abounds, those which will first be developed, as the mainspring of its future improvements, are agricultural and pastoral, either in combination, or separately. Its qualities in reference to them should therefore demand our immediate attention. Its manufacturing and mining interests must necessarily be postponed for these.

A general view having been presented of its adaptation to production, it will now be appropriate to give a more particular description of the particular portions of the country, with the peculiarities of each, as the best means of conveying a complete idea of the whole. In its locality on the continent it is central between the Atlantic and Pacific oceans; lying on the north-west corner of the Gulf of Mexico; extending as far south as 26 deg. N. L., as far north as 36 deg., and embraced between the lines of longitude 94 and 107. The main body of the country, however, is embraced within an area of about 700 by 500 miles, bounded on the east by Louisiana, on the north by Arkansas, the Indian Territory, and New Mexico; on the west by Mexico; and on the south by the Gulf of Mexico. The most remarkable thing pertaining to it is the almost endless variety,—a variety in everything pertaining to a country within the temperate zone. Each region of seventy miles square differs from every other in

some essential particular, except, perhaps, the great plains of the west. To illustrate this, let a line be drawn from the Sabine River on the east, to the Rio Grande on the west, on the 32 degree of north latitude, you will find, in passing from east to west on this line, a climate, first moist, then medium, and then dry; at first, tall forests, then scrubby growth, then prairie intermixed with timber, then bare and arid plains; first, a region well suited to the growth of cotton and corn, then of orchard fruits and grapes as well as corn and cotton, then of wheat as well as corn and cotton, then of the native grasses for grazing, with rich valleys for cultivation, and then whatever can be produced by irrigation.

A like variety, on that line, will be found in the face of the country, in its scenery, in its waters, its soils and sub-soils, and in the rocks, all in regular succession.

So, too, if we take a point on the Gulf at the mouth of the Colorado River and go north, you leave the sugar region, and passing through the cotton region, reach the wheat and grain region of northern Texas. If, however, you go west from the mouth of the Colorado River, you soon pass out of the sugar and cotton regions, and go immediately into the dry grazing region of western Texas, one of the best, if not *the best*, wool raising districts in the world, where the sheep graze the year round and are seldom housed. Thus it will be seen that similarity in latitude and longitude constitutes no reliable criterion of the climate or productions, as is the case in most countries. The explanation of this is greatly dependent upon its intrinsic and relative physical geography, and the character of its different soils and seasons.

Upon taking a broad survey of the whole country, we find it arranged into strips, or belts of country, having leading points of similarity, generally well defined, though sometimes inter-mixing, or running into each other.

A line from a point thirty or forty miles west of Corpus Christi, at the north-west corner of the Gulf, drawn north-eastwardly to a point on Red River, thirty or forty miles above Fulton, will sufficiently indicate the line of division between the forests of the east and south, and of the prairies

of the west and north; though it will be found that there will be tracts of prairie-country east of that line, and timbered tracts west of it. (See map 3.) Corpus Christi is the point on the coast where the Gulf has not receded from the undulating prairie. From that point west and north-east there is a belt of low, level prairie, which may be designated as

THE LEVEL GULF PRAIRIE BELT.

(See Map No. 3.)

North-east of Corpus Christi this level prairie widens as it proceeds, reaching at the Sabine River a width of forty or fifty miles. In its whole extent it constitutes one of the largest dead-level plains in North America. It has every appearance of having been formed by the receding of the waters of the Gulf, and is, at the upper-edge, not more, perhaps, than thirty feet in altitude above the Gulf. It has a variety of soil, such as sandy, dark mixed sandy, and black, stiff, limy soils. During the winter and spring it is wet. In most places water stands upon it, which rots or destroys the nutrition of the grass, and injures the land in cultivation. When properly drained, however, as it in time will be, in connection with the river bottoms that extend through it to the Gulf from above, it will be the great sugar, sea-island cotton, and rice region of Texas.

THE LONG LEAF PINE BELT.

(See Map No. 3.)

Immediately above and north of this level Gulf prairie, in south-eastern Texas, lies a body of long-leaf yellow pine, over one hundred miles in width, on the Sabine River from about Sabine Town (31 1-2 degrees N. L.,) down that stream, and thence west, diminishing in width for about one hundred miles. This lies just below the old San Antonio road (or the "King's Highway" as it was formerly called,) as it passes through eastern Texas, where it is in the shape of high, rolling ridges, or undulating plains, and becomes more and more level as you go southward, until it reaches the level gulf prairie, which it joins. The soil of this tract consists generally of very coarse angular sand, sometimes intermixed with considerable vegetable mould, with a poor sub-soil of yellow

joint clay, mixed with sand, and usually very deep. There is other timber than pine upon, and adjoining, the numerous streams of this region. The timber grows rapidly, with long, slender, pliant branches, and is intermixed with evergreens and vines,—especially the Muscadine vine,—indicating the prevalence of a great deal of moisture. The numerous and never-failing streams furnish water-power to saw up the pine, cypress and other trees, into lumber.

MAGNOLIA BELT. (See Map 3.)

There is, about the middle of this pine region, a very fertile belt, which may be denominated as the Magnolia belt, about twenty miles wide, running westwardly from the Sabine River (through Newton, Jasper, Tyler, Polk, and into Walker and Montgomery countries,) about 31 deg. N. L. It is not an unbroken strip, but is run into by the pine in different places, so as to make it irregular in form. It is overgrown with a magnificent forest of mammoth white-oaks, beach, sugar-tree, elm, water-oak and magnolia, with innumerable evergreens and vines, presenting, even upon the ridges, the appearance of a rich bottom, adjoining a river.

This forest grows on a deep, coarse, sandy loam, frequently with no firm sub-soil for many feet in depth, so that, when very wet, a cane can be pushed down by the hand ten feet, in many localities. It was originally a vast cane-brake, but is now overgrown with dense thickets, called hammocks. This soil does not last well on account of the fertility, consisting mainly of surface loam from vegetable decomposition, and from the rapid evaporation caused by the coarse sand, and moist climate. There are in this belt, however, spots of black, stiff, limy soil, just such as is found in the richest prairies, which is often covered sparsely with scrubby pine trees. These spots diminish in size, as you go from west to east. There is also another sort of mixed soil, partaking partly of the character of both of those last described, called "dirt lands," which, as well as the black, limy soil there, is very durable and productive. This is the region in Texas peculiarly adapted to the production of Cuba-Tobacco, especially on the ridges overgrown with water-oak and magnolia. It is also suitable for sugar, rice and cotton. These two belts of

level gulf prairie, and long-leaf pine, intermixed with the magnolia, extend eastwardly through Louisiana, getting wider and more scattered towards the north as they go east, until they reach the bottom of the Mississippi River.

THE RED-LAND BELT. (See Map 3.)

Above the long-leaf pine belt is that of the Red-lands, reaching from the Trinity River to the Sabine, about and above the line of 31 1-2 degrees of N. L. (in Houston, Anderson, Cherokee, Nacogdoches, San Augustine and Sabine counties.) Though scattered in its western end, near the Trinity it becomes concentrated, while diminishing in width, nearly to a point, before it reaches the Sabine River. In Nacogdoches and San Augustine counties, it is usually not more than from six to ten miles wide. The soil is dark red, very firm and when wet is "waxy" or sticky," like the black, limy lands, and is several feet deep. It is underlaid by a red clay under which is often found a bed of shell lime rock (being sea-shells with a clay and sand cement) of a bluish grey color. This is a fine building rock. The same material, not yet matured into rock, is found also in the shape of bluish shell marl, which, when dug out and exposed to the air, becomes an excellent fertilizer, as would the rock if burned. This red-land is very durable and fertile, though, from its mixture of lime and oxide of iron, it is inclined to be very droughthy unless it is broken up very deeply, which must be done in early spring or winter, if done at all. It is well adapted to corn, wheat and other grains, and also to cotton, while fresh, or when deeply tilled. The face of the country is bolder and more broken than that south of it, and it is overgrown with a rather low, well branched forest of hickory, black-jack, post-oak, red-oak, elm and other trees, whose foliage is of a very rich, dark green color.

THE BLACK-JACK BELT. (See Map 3.)

This red-land is the lower edge and, indeed, is a part of a belt of country that lies in a direction north-east and south-west from the north-eastern corner of Texas, towards Corpus Christi on the Gulf, diminishing as you go south-west; which, from the uniform prevalence of that timber, may be denominated as "the black-jack belt." Other trees such as hickory,

Division by regular belts of country.

red-oak and post-oak abound, all of which are low and heavy-topped. It has in it spots of red and of chocolate land, and sometimes, though rarely, of dark prairie land and also of high table-lands. This belt generally has a deep, dry, easily pulverized soil of fine sandy loam, usually grey, or yellow, or an ashy color, underlaid by a compact red, or yellow clay sub-soil. Abounding in iron-ore hills, the soils adjacent thereto are reddened and enriched thereby. This belt is characterized throughout by a mellow, loose, dry soil of very fine texture, most of which is soluble in water, with sufficient sand to prevent it from running together, and from breaking up into clods when plowed. And though possessing a general similarity, there is considerable variety both in appearance and in fertility. It is all high and rolling, or undulating in its surface, and abounds in springs of free-stone water. It is distinctly and well defined in eastern and middle Texas, diminishing in width as you go south-west, being about eighty miles wide on a line through Rusk, Smith and Van-zandt counties. This is peculiarly the region of mixed crops, adapted to the medium production of almost everything that can be produced in the temperate zone, as corn, cotton, potatoes, wheat, apples, peaches, pears, plums, figs and garden vegetables. Being also much dryer and higher than the region below it, it is well adapted to the culture of grapes. Indeed it is a natural vineyard, having native grapes bearing well and growing wild all over it, some of which are as large and palatable as the cultivated grapes. The species most common is the large post-oak, or sand-hill grape of summer. This belt is extended through north-western Louisiana, and into the interior of Arkansas, expanding and becoming less distinct as it goes in that direction, being more broken into by other adjoining formations.

SHORT LEAF PINE REGION. (See Map 3.)

In the state of Louisiana, lying between the black-jack and long-leaf pine belts, is a well marked, large district of short-leaf pine country, intermixed with red-oak, as the next leading growth, though abounding in a great variety of other trees, including the dogwood. The muscadine grows all over it, indicating its fitness for the culture of the scuppernon grape.

This section, in reference to moisture and fineness in the sand of the soil, is about a medium between the long-leaf pine and the black-jack belts; is underlaid by a red and yellow clay sub-soil, the surface being almost invariably dark gray and compact, rather than loose and mellow; and is well adapted to cotton, though not so well suited for grains, fruits and grapes as the black-jack region, on account of the greater moisture, coarser material of the soil, and flatness of the country. This character of country covers a broad district from Pine-Bluff on the Arkansas and Monroe on the Washita Rivers, extending in a diminishing body into the eastern part of Texas (in Shelby, Panola, Harrison and Cass counties,) and extends itself south and west in broken, detached parcels and strips, considerably into the black-jack belt, constituting the pineries of north-eastern, eastern and middle Texas. Wherever found, the soil is closer, coarser and more moist, than that of the body of the country in their vicinity. They do not reach further than to the middle, and never go to the western edge of the black-jack belt by a distance of thirty or forty miles, by which that belt preserves an uninterrupted body in its whole course in Texas just below the prairie line.

THE BLACK, LIMY BELT. (See Map 3.)

The next belt is that of the black, limy prairie, which, leaving the Rio Grande, just below the mountains, below the mouth of Devil's River, and above the level Gulf prairie below Lerado, sweeps around below the mountains (at San Antonio and Austin) and turning northward, in more distinct form, is bounded by the line of mountains and cross-timbers on the west and by the black-jack belt on the east, and passing over Red River, scatters itself partially into the south-western part of Arkansas; (as is evidenced by the black, limy lands of Hempstead and other adjoining counties of that state) but principally passes over the Indian Territory, west of the flint-rock hills and mountains, which cover most of the western portion of Arkansas reaching down to Little Rock on the Arkansas River. This belt, not well defined west of San Antonio, but much better north-east of Austin, is from thirty to eighty miles wide, getting broader and putting out off-shoots

as it goes north-eastwardly. In approaching it from the south-east and east, in its course, you do not come suddenly upon a broad, extensive prairie, but upon small prairies first and then larger, for fifteen or twenty miles. This mixed tract or strip, between the timbered country and the prairies, is generally very level, partaking in its soils of a mixture of the two, and affords a great amount of valuable timber, especially post-oak, which, next to pine, is perhaps our most valuable timber, and which indeed may be said to be the fencing timber of Texas prairies, although in some parts of the west fences have been made extensively of cedar rails and polls. The black-jack timber also thrusts itself liberally on this disputed territory. The soil is a medium between the grey, loose, sandy loam on one side of it, and the black, stiff or sandy lime land on the other, and is regarded as thin land. Being flat, it holds too much water in the spring season, and bakes hard when the heat of summer dries it. Much of it is like the post-oak flats, or swags of the black-jack region and must be improved by drainage.

In this neutral territory the prairies have names given to them by the early settlers. Around their edges in middle and southern Texas, the trees are often loaded with the mustang grape. Leaving this strip you will rise upon a high, rolling prairie,—grand to look upon,—with winding streaks of timber in the valleys of the streams, whose low tops do not impede the extensive view before you, or with a little mott of timber here and there upon a ridge, seen at a distance, like an island in the sea, you pass generally over a black, sandy soil, and finally enter upon the deep, black, stiff, limy lands, which are about as rich as lands are ever found in a state of nature. The soil is from two to ten feet deep, and, indeed, the sub-soil is similar to the surface in its ingredients of lime, gypsum, clay, and sometimes sand and other materials, with the exception of the vegetable matter, incorporated with the surface soil by the decay of the grasses. It rises gradually, as you advance upon it, to its western and north-western verge, when you find yourself upon an elevated ridge, where the white, soft cretaceous lime-rock crops out, which underlies the undulating, rising plain that you have passed over, and from

which point of elevation you overlook usually a deep, broad valley of three or four miles (sometimes less,) in width, and see a little blue streak above the horizon, which is the lower cross-timbers if you should be in northern Texas, or the mountains if you should be in middle and south-western Texas, which are more distinctly seen and not so far off. The bottom lands of the rivers and other streams that pass through this belt, from the country above it, are usually covered with a dense body of timber of various sorts, as post-oak, spanish-oak, over-cup-oak, elm, ash, hack-berry, chittum-wood, pecan and others. Upon the ridges and flats between the streams may frequently be seen clusters of scattered musquite trees, which resemble an old neglected orchard of peach and apple trees. The musquite is a very hard wood and makes an exceedingly hot fire. It is peculiarly the growth of the whole prairie country and is increasing very fast in the west.

The surface of the earth being stiff, limy material, holds the water that falls on it, and the almost constant winds that sweep over it facilitate its evaporation, and for that reason, also, there are but few springs, because the water cannot sink into the bowels of the earth to be there stored away, for a source of supply to fountains, as is peculiarly the case in the more loose, sandy loam in the black-jack belt, where springs are very numerous. This black, limy belt is pre-eminently adapted to the rich native grasses that grow on all parts of it most luxuriantly. As it sweeps around (the segment of a large circle,) from the Rio Grande of the far west, to Red River of northern Texas, a distance of at least six hundred miles or more, it is necessarily subject to great variations in its climate and productions. Two hundred miles of the north-eastern end of it, together with the black and dark-red prairies, lying between the lower and upper cross-timbers, (about twenty-five miles wide,) constitute the great wheat region of Texas. It is probable, also, that experience and fair trials will soon point out the way to make two hundred miles more of it a fine wheat and small grain country. The extreme western portion of it is likely to remain a grazing region on the up-lands, on account of the dryness of the sea-

Division by regular belts of country.

sons, until irrigation shall have been resorted to, as a means of insuring abundant crops on its rich soil. Its fertility generally seems to be inexhaustible; and when the seasons suit, it brings large crops of corn, cotton, tobacco, turnips, sorgo and small grains. The mustang grape grows wild in great abundance, in most parts of it, usually near the streams, or in the hollows. It is a large, rough, brown grape, good for wine and brandy; and bears by the wagon load, rather than by the bushel.

This black, limy belt is not regarded so good for garden vegetables and orchards, except in those spots in which there is not a stiff, limy soil. The famous Bois d'arc timber, (pronounced Bodark,) is found in a belt of country about twenty miles wide, running from the mouth of the east fork of the Trinity north to the Red River. It is perhaps the best wagon timber in the world, from its not shrinking, nor rotting as other wood does; it is used extensively in hedges and is thought to be valuable as a dye.

THE MOUNTAINS AND CROSS-TIMBERS. (See Map 3.)

At the upper edge of this black, limy belt, which is generally about six hundred feet high, is found the mountains which connect with the lower cross-timbers of northern Texas, and constitute the terminus and base of a vast, undulating and often rugged, plain, ascending rapidly towards a mountain center to the "Staked Plain," situated partly in north-western Texas, and partly in New Mexico, about four thousand feet high (which is above the average height of the Blueberry Ridge of mountains). It is, indeed, but a high, broad table land, connected with the Rocky Mountains, with its western range in the shape of rocky cliffs rising on the plain below, which are called mountains. The cross-timbers as they are called are two parallel belts of granite and other rocks, each from fifteen to twenty miles wide, and about twenty-five miles apart, growing on a sandy soil running nearly north from the Red River to the Brazos River where they are joined, and apparently form part of the chain of mountains that they are called in middle and south-western Texas. The soil in the cross-timbers is generally a coarse, yellow, sandy loam with an occasional piece of small granite and high

peaks, indicating a marked change in the face of the country, from that of the black, limy plain below.

THE HIGH DRY GRAZING PLAINS AND THE STAKED PLAIN.

The staked plain (so called from the fact that the Mexicans staked it with posts as guides in passing over it,) is high table land extending for about ninety miles, in going over it from east to west, on the route from northern Texas to El Paso. The plain, descending east and south from this to the mountains and cross-timbers, is the great grazing region of Texas—of vast extent.

All maps of North America made forty to fifty years ago, presented a large tract of country included in the term "Great American Sandy Desert." Latter explorations prove most of it to be better than the average farming districts of the north-eastern states. So with the "Staked Plains." For many years they have been supposed to be of little or no value; but all of the engineering parties sent over it the past few years, report that much of it is very fine grazing land.

Possessed of a rich, limy soil in its vaileys and high plains, it requires very little moisture in the winter and spring to bring forth a crop of nutritious short grass, which, from the dryness of the climate, matures and is turned into good hay on the ground, thereby furnishing food for stock during all seasons of the year, because it does not there rot in the winter, as do the grasses near the coast by excess of moisture. The lower edge of this grazing plain has, running through it, bold streams with rich valleys that produce finely; and many of them will doubtless be irrigated where it is necessary, as it generally will be in most parts of that region. Part of Texas lying north of the Red River, sometimes called the "Pan Handle," is a part of this plain just described, and partakes of the same character.

THE PECOS AND RIO GRANDE.

Those two rivers run southward from the very high mountains in New Mexico and Colorado, and, in their whole course in Texas, pass through a dry country. The farms, cultivated below El Paso on the Rio Grande, are famous for their fruits, and especially for their grapes, which for table use, and for wine, are regarded as inferior to none in the world. Most of

the country through which these rivers flow, (except the lower Rio Grande), constitutes a part of the high descending plain that has been described. Most of the rivers that flow out of, or through the regions of the "Staked Plain," (as do the Pecos, branches of the Colorado, of the Red River, and the Arkansas River), have their waters made bitter by the extensive gypsum bed of that region, which is said to be not less than three hundred miles square; and this is also one cause of the remarkable fertility of the bottom-lands of those streams that are occasionally overflowed. The whole of this elevated grazing region is underlaid with a substratum, mostly of limestone rock of various kinds, genenally much harder than that of the region below.

To understand the qualities and natural resources of Texas in all of its parts, this classification into belts should be studied by aid of the maps, so as to fix it indelibly upon the mind. These belts that have been described, though they may slightly intermix, or break into each other, at their contiguous margins, and therefore not always form a regular line; yet, if a broad view be taken, they will be found to have a substantial connection in all of their parts, and to have well defined characteristics.

Nor is this a useless, or merely curious, investigation, for, considered as a matter of practical utility, the understanding of the peculiarities of each section, and the nature and causes of production there, and the reason of the difference between that and other sections, is one of the very best means of comprehending the true science of production generally. It furnishes material for comparison under different conditions, and facilitates the tracing of the effects observed, back to their true causes, and spreads out a wide field for study and improvement.

Though there is a similarity in the vegetable growth of each one of these belts of country, there is, nevertheless, a marked difference, produced by the different character of the climate, in reference to the heat and moisture, prevailing in each portion of the country, as exhibited in the previous chapter on the "Physical Geography of Texas." Hence, we find a very different production of vegetable growth on the black,

limy soil of northern Texas, from that on similar soil in the extreme south-western part. The two chapters must be studied with reference to each other, in order to fully understand the condition of things which, in any particular locality, affect vegetable production.

CHAPTER IV.

COMPARISON OF THE DIFFERENT BELTS.

A comparison of the different belts of country, with reference to the productions in each, and with the reasons therefor.

The tendency to increase the fruit-bearing in trees and crops, as the wood-producing capacity diminishes, and to what extent, as exhibited in the different belts of country that are found in Texas.

Bottom lands in Texas. How they are formed, and the different kinds in the different rivers and other streams in Texas. Their qualities, and how they may, or may not, be redeemed from overflows. When overflows are necessary, and when not, to preserve their fertility.

Benefits of generalization and classification in the description of a country.

Having, in the previous chapters, pointed out the leading characteristics in the climate and soils, in the different sections of the state, and designated the various belts which traverse its territory, with some of their prominent attributes, it may be instructive to consider their qualities in comparison with each other, as well as some of the reasons of the difference, for the purpose of impressing a more definite idea of each. After which the bottom lands upon the rivers and creeks may well demand our attention, as but little reference has heretofore been made to them. (See Maps 1, 2 & 3.)

It may be remarked that heretofore, as will be the case hereafter, reference has been made to the growth of trees, not that the growing of trees is an object of attention or interest for the sake of the trees themselves at present, but because the manner and size of the growth of trees during a series of years, or generations, together with the kind of trees grown in any section of country, is one of the very best indications of what cultivated crops the country is capable of producing; which fact is well known to thoughtful agriculturists. It is a well known fact, for instance, that cotton will grow in the shape of the trees of the forest where it is planted, and will bear its fruit very much in proportion to the fruit-bearing

trees there. In all those parts of eastern Texas that have been found to produce superior and abundant orchard-fruits, their capacity in that respect is plainly indicated in the native growth of the wild plum, haw-trees of different sorts, hickory, walnut and many other fruit-bearing trees on the up-lands.

The same may be said of the vines. Smith county, in the center of the black-jack belt, may be truly said to be a natural vineyard; grape vines, mostly of the large post-oak or sand-hill species, grow all over it; which plainly indicates what experiment has demonstrated, its capacity to produce fine vineyards of cultivated grapes. The muscadine, so common in the moist regions of the extreme eastern part of the state, point to its fitness for the scuppernong, which is itself a muscadine, originating in the low, moist country upon the coast of North Carolina.

In the moist regions of the east the trees are large with long, slender twigs, and few thorns. In the dry region of the far west, in the same latitude, thorns or stubbed limbs cover all the trees. That plainly indicates that the fine grasses of the west would be smothered out by the dense and rapid growth of trees in the east; and that sugar and cotton would not grow in the far west (except on farms irrigated). For this purpose, then, addressing myself first to the comparison of the various sections or belts heretofore pointed out, it may be asked what makes a tree, a grape vine, a plant of corn or cotton, stock of wheat, or a blade of grass grow?

You see an acorn planted in the soil. It has the oak-tree in embryo in it. The roots shoot down and the stem upwards. The stem forms into a body with branches, covered with foliage. There it stands after fifty years growth, in the same place, having increased by accumulated matter, to many tons weight. The acorn did not weigh one-half an ounce. Near it stands an ash, a sugar-maple, a pine, a sweet-gum, a walnut, and a cherry tree, that have all grown and increased in the same way, in the same character of soil, and under the same circumstances. (There is an acre of ground in Smith county, where there are three times as many different sorts of trees, as those here mentioned, now standing.)

The earth does not seem to have been diminished in bulk

in the formation of this great increase of vegetable matter, The qualities of these trees, that have thus grown together, are each different from the other, in almost every respect. Yet they have not had the power of locomotion, to travel off and select their respectively peculiar qualities. They have gotten them where they stand. They exist as the inhabitants of two natural regions,—their roots in the earth, and their body, branches, and foliage in the air. The ingredients of the earth, and of the air then, by their co-operation, have given them the increase of weight, and furnished them so great a variety of materials in the same locality. They will not grow without the air, or without the earth. The truth is, that both the earth and the air, not only furnish materials from their own intrinsic ingredients, but also act as agents in collecting, preparing and transmitting other materials to act in aid of themselves, in producing these trees. This proposition may be illustrated by supposing a similar cluster of these trees to be growing in the different belts of country as described in the previous chapter. On the Gulf prairie the sweet-gum and the pine might flourish to some extent, but most of the others, unless under very favorable circumstances, would hardly survive the excessive change from the moisture of winter and spring, to the dryness of summer and fall. On the magnolia belt, in the long-leaf pine region, they would all flourish together in magnificence, growing tall and large. On the black-jack belt they would grow well, but with diminished size and height, and with heavier tops and more branches. On the black, limy belt the sweet-gum and pine would disappear for the want of moisture; also the ash and sugar tree, except in the bottoms. On the plains, above the cross-timbers and mountains, the oak, if of a species as hardy as the live-oak, might grow as a scrubby tree in favorable localities; all the others would, as a general thing, not survive the heat and dryness. On the staked plain none of them now do grow at all. In all of these localities, soils with sufficient materials of fertility exist to produce them, and the air itself (in its mere mixture of oxygen and nitrogen), is exactly the same in each locality. In the production of fruits as the apple and the grape, or of fruit-bearing plants, as cotton, corn, and wheat,

equal variations would appear, though not in parallel order; for in the pine region the apple trees, though large, would not bear much good fruit, and so of the grape; corn would be light, and cotton long-jointed, and wheat would generally fail from rust, or other causes, notwithstanding it is the best region in Texas to produce mere growth of the wood, or stalks. In the black-jack region the fruits would be better, though the wood growth would not be so large. In the black, limy belt the fruits would rather improve in amount, in proportion to the diminution in the growth of wood, and the wheat largely in quantity and weight of grain. In the dry plains above, the difficulty seems rather to be in producing the wood to bear the fruits, than in any want of adaptation to fruit-bearing in them, when sufficiently produced and sustained. For on the irrigated lands of the Rio Grande near El Paso, (32 deg. N. L.,) these fruits are not only abundant, but of the very finest quality, especially the grapes. Indeed, the tendency to fruit-bearing seems to increase in proportion as the wood-producing tendency diminishes, until it reaches a point where there is not enough wood produced to bear the fruit.

In the same sections these differences, both in wood-producing and in fruit-bearing, are dependent upon the difference in the soil, in its composition alone, other things being equal. In the long-leaf pine region, the spots of black, limy soil produce more grain than the hammock lands of coarse, sandy loam adjoining them. The sandy or mixed soils of the cross-timbers produce a variety of scrubby trees, while the adjoining black, limy soil of the prairie is bare of trees generally. The iron-ore hills of the black-jack belt produce a vigorous growth of hickory, red-oak and black-jack, whereas, the adjoining "sand flat" ridges may produce only the blue-jack, or very dwarfish post-oak, and the next ridge of coarser, stiffer, sandy soil may be covered mostly with short-leaf pine. A difference in production is also attributable to the compactness or looseness of a soil alone, irrespective of its ingredients. A rock may be composed of lime, clay, sand and other ingredients, in such combination as to readily make a fine soil, if crushed and pulverized, and nothing but a scanty moss will cover its surface; whereas, its loose debris at its base may

bring a rich growth of wood. So the fertile, stiff, red or black lands will produce but poorly, unless broken up before the increasing heat of summer has rendered them too hard to be pulverized deeply. That is not so necessary on the sandy loam of the black-jack belt, because it is usually found in a state of natural pulverization. On the other extreme, however, vegetation cannot spring forth upon a loose, drifting sandy plain, like the desert of Sahara, any more than it can upon the loose, wind-beaten sand near the beach of the gulf. It is too loose, as the rock is too hard, to produce vegetation. In the case of the rock the particles are fixed to their places, and do not permit a circulation of air, water or heat sufficiently to generate a chemical process, which is necessary to furnish food to the roots of plants. Whereas, in the excessively loose sand, too much heat may be admitted, or the sands may not be sufficiently fixed to enable the roots to hold their position.

The warmth of spring brings forth vegetation in rapid haste, to clothe earth in radiant verdure. Declining summer, in sultry heat, makes it pause and rest for a new start in early fall. The chill winds of autumn disrobe it of its faded beauty, and frosty winter holds it stationary in its iron grasp. These changes are all the result of the degrees of heat in one locality,—first stimulating by gradual approaches, next depressing by excess, again stimulating by moderation, and lastly locking up by its absence. Heat itself, like moisture and soil, is subject to numerous variations in its effects, dependent upon its combination with other things. The heat that scorches the brown plains of the far-west, invigorates the deep-green forests of south-eastern Texas; and the cold, that rots the grass on the wet gulf prairie in winter, leaves unharmed the nutrition of the grass, on the dry prairies of the north-west, though there more intense. Corn will not grow on a deep bed of pure lime or ashes, though excellent manure when scattered, because chemical action requires more than one substance in manufacturing food for plants. Subsoils, as well as soils, produce great differences in the same locality, for the reason that their mineral ingredients are brought to the surface by the evaporation that is usually tak-

ing place. Hence, a good clay or lime substratum seldom fails to make rich soils, and to aid in keeping them so. The effect of electric action is readily perceived in the freshness of plants after a thunder shower in summer. The asparagus springs out of its bed in the night, an inch or two, succulent and colorless, the light of the sun during the day turns it green, and gives it toughness and solidity. Hence, our cloudless prairies produce the horn-like musquite wood that will hardly decay with time, and, when dry, burns almost without smoke. They produce also the Bois D'Arc and the live-oak, both of which are extremely solid and durable timbers.

BOTTOM LANDS OF TEXAS.

Throughout the Mississippi valley, and particularly west of the river, there is a great disparity between the amount of water which flows down the streams in different seasons of the year, and in different years. In summer and fall the amount is usually small, in comparison with that of winter and spring. Hence, our streams, both large and small, are provided with two beds, or aqueducts, for carrying off the water, one embraced within the other. One of them is a small channel, only sufficiently broad and deep to contain and carry off the water that flows, ordinarily, down the stream. The other is a level space, from twenty to two hundred times broader than the channel, and through which the generally crooked channel meanders. This broad space, called the bottom, serves the place of a bed of the river or creek during the overflows of spring and winter. It is, however, not needed for that purpose but a few days or weeks, perhaps at several times, during the winter and spring, and seldom ever in the summer and fall. The Mississippi and some of its tributaries usually overflow their bottoms in the early part of summer. This is produced by the melting of the snow at their heads. None of our rivers in Texas, except the Rio Grande, and perhaps the Pecos, are subject to so late an overflow from this permanent cause, as their heads do not reach a region where the snow lies on the ground longer than a few days, or weeks, at one time. These bottoms also act as a reservoir to hold much of the water of the overflow, which sinks into and fills the earth, also, the lakes, ponds, and low places in the bottom,

remaining there after the great body of the overflow has gone down; and gradually finds its way into the channel, as the water in the channel falls, thereby aiding the navigation of the stream long after the overflow of the river. This bottom being covered with water only a short time, a dense, heavy forest of trees usually flourishes upon it, which protects the surface from the rays of the sun, and protracts the duration of a humid atmosphere. But for this forest, this quality of the bottom, as being the occasional bed of the stream, would be manifest to all.

Thus, when there is an overflow of the stream in the winter, or spring, there is a guaranty of moisture to sustain summer crops in the bottom, from a local source, in addition to the moisture supplied from rains during the year, and from the general moisture drifting in the air.

The substance of these bottoms is formed by the deposits of decayed leaves and drift-wood, combined with the earthy materials of the muddy current that covers them, when the streams are swollen by overflows. They contain no regular strata of earth near the surface. The difference that is observable in digging downwards, and the difference that is to be found in the surface soil in different localities on the bottom of the same stream, are attributable to the different materials that come down, and are deposited in, the successive overflows. Thus it is that the surface soil, and substrata of earth in the region of country towards and above the heads of a stream, give character to its bottom in its whole course. And where several branches of a river derive their source from regions of different sorts of earth,—that is, one abounding in sand, one in clay, another in lime, or the like,—the bottom on the river below the confluence of these tributaries will exhibit deposits from each, either in combination, or separately. In this way masses of fertilizing materials are thrown together and constitute the deep and varied soils of our alluvial bottoms. To appreciate fully the amount of fertilizing material, mineral as well as vegetable, it is necessary to consider that all of our bottoms, periodically, if not annually, are overflowed; that all of the waters of the overflow, (apart from the coarser particles, which make them turbid) hold in solution a large

amount of fertilizing matter, as lime, gypsum, marls and the like, which sinks with the water to a considerable depth in the bottom land, and, when the water is at rest, is deposited and incorporated with the other mass of made-land, thereby, with each successive overflow, adding to, and disseminating into the mass of alluvion, new, enriching materials that descend in solution with the water from the fertile tributaries of the stream. (Some idea of this may be obtained from observing the whitish deposit upon the sides and bottom of a glass tumbler in which the clear Colorado River-water has been standing for a single night.)

It is in this way that the red marl plains, scattered above the lower "cross-timbers," are annually pouring their enriched red floods upon the bottoms of Red River, and of the Brazos. In this way the vast gypsum field, with an area equal to three or four hundred miles square, lying upon the head waters of the Pecos, Colorado, Brazos and Red River, sends down those streams its bitter waters, freighted with a fertilizing material, that makes their bottoms teem with an exuberant fertility, equal to that of the Nile. In this way, also, the broad lime belt, stretching clear across the state from the Rio Grande to Red River, spreads its richness upon the bottoms of all of our rivers that rise in, or pass through, it. These occasional overflows are necessary to sustain the fertility of the bottom lands, when they are cultivated. The smaller and the more shallow the streams are, the greater is the necessity for the overflow.

In a large, deep river, such as the Mississippi, or the lower part of the Red River, which has been levied, and thereby a portion of its bottom redeemed from overflow, the great weight of the water in the channel, and of the back water that lies or runs, in the rear of the redeemed space, causes the river-water to percolate the whole interior mass of the bottom, below the dry surface of the farms. This percolation to a great extent, supplies the place of an overflow, and prevents the usual effects of a drouth. Upon our creek and small river bottoms, the influence of this percolation is quite limited, and, therefore, as to them, an occasional overflow is more necessary to keep up their original fertility.

Our tillable bottom lands, that can be reclaimed from overflow, are made in two very different ways, and are differently located in the bottom—one lateral, or on the margin of the bottom, and the other central, along the ordinary channel of the stream. A knowledge of this process may aid in their successful reclamation.

There are from time to time, that is, once in about every seven, ten, or twenty years, extraordinary overflows, when, as it may be supposed, all of the tributaries of a stream are swollen at the same time, which heaves out of the channel immense masses of earthy matter, and deposits it mostly upon the borders of the stream that runs in the channel, and carrying the rest out, widens by elevating the general surface of the bottom. This process, aided by occasional cut-offs in the bends of the crooked channel, and the formation of lateral channels, or water-ways, (commonly called "sloos") causes a portion of the bottom, generally upon the margins of the channel of the stream, to be more elevated than the rest, and not subject to the ordinary annual overflows of the stream. Upon these marginal tracts, thus elevated, our river farms are situated, particularly on the larger and more rapid streams, such as the Brazos, the Colorado and Gaudaloupe. Unless protected by levies or break-waters, or water-races at the edge of the bottom of the strip, they must necessarily be overflowed periodically.

The other mode, by which elevations are made in the bottoms, is very different. Let the stream or channel of a creek or river bear off and run to one side of its bottom for some distance, and another smaller stream, dashing down from the neighboring hills, enter the opposite side of the bottom; the smaller stream, particularly if it should be what is called a dry creek, or branch, will wander through the bottom, and very soon lose its channel entirely, and spread the sediment of its overflows all over the adjacent region of the level bottom; and its turbid waters, not being readily drifted off by the current of the larger stream, gradually makes a deposit, that elevates a tract of land on the outer edge of the bottoms, which is not subject to the ordinary overflows of the larger stream. When this tract of lateral elevation is brought into

cultivation, it is only necessary to make a sufficient channel, or water-way for the smaller stream, so as to convey its waters into some lower portion of the bottom. The sluggish streams of eastern and middle Texas have much more of such lateral elevations, than the swift running streams of the west, as may be seen on the Sabine, Trinity, Neches and other streams. For the more rapid the current of a stream is, the more elevated bottom it will form contiguous to the channel, and the less lateral elevation, because its pressing current sweeps down all lateral accumulations, and invariably causes the out-edges of the bottom to be lower than that part which is near the channel. This may be aptly verified by reference to the two rivers, the Sabine and the Gaudaloupe. The latter, the Gaudaloupe, leaves the edge of the mountains at an elevation of about 600 feet, and pitches down to the gulf in the distance of less than two hundred miles. The former, the Sabine, rises near the east fork of the Trinity in Collin county, at an elevation of nearly 600 feet, and creeps in a serpentine track, through a distance of at least four hundred miles before reaching the gulf. The same rules hold equally good when applied to creeks and bayous, as to rivers.

Now the great problem to be solved, is, how can these fertile bottoms be rescued from the devastations of these overflows? It cannot be done by levies on the banks of the channel, for the simple reason that the channel cannot hold and carry off all the water of the overflows. If it could, there would never have been a bottom tract formed. In this, as in all other works of human improvement, Nature points the way. Let any bottom be examined, and where there are the most, the deepest, broadest, and longest water-ways, (or sloos), cut out by force of the water, there is the most redeemed high land in the bottom. In the effort to carry out the plan here suggested, it must be predicated upon the impossibility of redeeming the whole bottom; and that leads to a calculation in every given case, as to how much space of the bottom must be given to the water, and by what means shall the water of the overflow be made to run in that abandoned space, with such speed, and in such volume, as not to intrude on that part of the bottom sought to be reclaimed for cultivation:

This is simple, and practical, and will be carried out to the improvement of many of our streams, both large and small, when we shall have learned and practiced upon the great advantages of co-operative effort, by which broad water-races will be made for ten miles, nearly straight in our creeks, and for fifty miles in our rivers, so that the waters of the overflow will rush down them with the velocity and force of a mill-race. There is, and of course can be, no relief by that or any other precaution against those periodic overflows, when the whole bottom is submerged to the depth of eight or ten feet, as was the case with the Red River in 1849, and with the Colorado River only a few years since. Our rivers in eastern and middle Texas, not having their sources so high up as those of Red River and the Colorado, where such deluging rain-storms are accidentally, and only occasionally, drifted, are not subject to such extreme inundations.

CLASSIFICATION AND GENERALIZATION.

Some years ago an effort was made in the "Texas Almanac," to give a description of Texas, by publishing a description of the qualities, productions, &c., of each county separately. A great deal of information was thus collected. Its utility, however, depended too much upon mere recollection.

By the classification and generalization adopted in this and the preceding chapters, a knowledge of the qualities and productions of any locality may more readily be acquired, and more certainly retained in the memory. By this system, for instance, if the question be asked, what sort of a country is it in Jasper county, in Live-Oak county, in Harris county, in Collin county in Comanche county, or in El Paso county, it will only be necessary to look at the map of Texas and find its locality, in reference to the different belts, and the climate, dependent upon its physical geography, to answer the question.

So if it be asked, what is the character of the bottom-lands of the Sabine, of the Trinity, of the Colorado, of the Gaudaloupe or Neucces rivers, the question is easily answered, from their length in the gulf plain, and from the fall of their water per mile in their respective course in it.

CHAPTER V.

NATURAL SOURCES OF WEALTH.

Natural sources of wealth in Texas in its minerals and timbers; and trees, shrubs, plants and flowers, as objects of utility and ornament.

Coal and coal oil. A vein of lignite from the Sabine River to the Rio Grande and coal in different places.

Copper in northern Texas. Gold and silver—the tradition concerning them, &c. Iron abounding in the east and found in the west. Rocks for buildings, fences, and other purposes, found in almost every region.

Gypsum, clay, marl and sand.

Fertility of soil largely dependent on character of the sub-soils,—interesting exceptions in parts of eastern Texas and the reason therefor.

Wood and fencing. Post-oak—the great fencing timber of the prairies, &c. Red-oak and Black-oak in the east. Cedar—its localities and use for fencing. Pine timber in south-eastern Texas,—its amount and the advantages connected with it. Cypress-timber in same locality. Hickory and white-oak in the east for wagons and carriages. Bois D'Arc timber in northern Texas—its uses and value. Live-oak of the south and west, its boundary and extent. Pecan, its locality and value. Musquite of the prairies.

Hedges—great profit of—must be made of a plant or shrub. The Prickly Pear—its uses as a hedge and otherwise. The Pappaw and persimmon—their uses. Other trees, plants and flowers.

Cordage—Bear grass in eastern and middle Texas good for ropes, &c., its uses. Medicinal trees and plants, large number specified. Wood-growing—the China tree and tree of Paradise. The valuable lessons taught by the forests of a country.

Texas has a vast natural wealth, for the most part yet undeveloped, in her rocks and other minerals, in her forests of timber trees, and fruit trees, and in her other trees, shrubs, vines, plants and flowers, which are objects of ornament and utility. We will now attempt to give some account of this wealth.

COAL AND COAL-OIL. (See Map 4.)

There is a bed of lignite that crosses the Sabine River in Shelby county, fifteen or twenty miles below the 32nd degree of north latitude, and running south of west through the state. It may be seen in the banks of the different rivers. When dried it burns as freely as dried wood. Above this, another

bed of lignite or imperfect coal runs somewhat parallel with it through Cass county, through Marion county below Jefferson, and on through Cherokee county, in the direction of Bastrop, near which place it is also found. It is found near Fort Belknap, high up on the Brazos, of superior quality; and it is fair to presume that upon that line of altitude it may be found clear across the country. It is said to have been found in many other places, but there has as yet been no such examinations as to establish connected beds of it, corresponding in direction with the lignite bed referred to. Each bed improves in quality as it is found to lie further up the country towards the "staked plain." Enough has been ascertained to demonstrate that it will be found in abundance in different parts of Texas, when it is needed. The oil-spring, as it is called, in the Indian Territory, just north of Red River, gives promise of coal oil in one of the upper lines of coal that passes through Texas. The oil spring, or as it was called by the old settlers the "tar spring," within a few miles of San Augustine, together with other indications on the line of lignite, show that coal oil may be found in this state. The oily matter that exuded from the "tar spring" was used as tar in greasing wagons, and, also, as a remedy for the tooth-ache by the early settlers in that section.

A most remarkable effect is attributed to this oil, that exudes from the surface of the earth in the water upon the gulf coast not far west of Sabine Pass. When the beach in that locality is unusually lashed by the waves in a storm, the oil rises to the surface, and levels it for some distance out from the beach. It is said, that this being known to those engaged in the coasting trade with small vessels, the place is sought as a safe refuge in time of a storm.

COPPER. (See Map 4.)

Copper ore of good quality is found upon the waters of the Wichita Rivers in northern Texas, and has been discovered in various places in a large scope of country in that section; which, being uninhabited, has not yet been worked. It promises great wealth to the state in the future, as it is in close proximity to the region of good coal, and will before long be reached by railroads.

GOLD AND SILVER.

Ever since De Soto made his expedition into the territory of Texas in search of gold, as it may be imagined, but certainly for many years back, there have been rumors circulated that gold had been, and could be, found high up the rivers in Texas. Many have been the attempts to find it, and often has a feverish excitement passed through the country, aroused by some fresh version of the old tradition, that it certainly could then be found. It was said for a time that it was privately known to some persons who did not endeavor to open the mines, because minerals and salt springs had been retained by the state, in pursuance of the Spanish and Mexican custom. Still, notwithstanding the late removal of that impediment by a provision in the constitution, the gold, if it is there, has not been molested. It is probable from the geological strata there exposed to the surface, and from other indications, that the tradition will still be confirmed. There are the remains of a mining establishment in the upper portion of Llano or San Saba county, where it is said the Spaniards worked a silver mine. There is an ore in Van Zandt county that makes a hard, white metal. Doubtless other valuable metals will be discovered when the country is settled, and there is sufficient labor to dig them out of the earth.

IRON.

There is (so to speak) a back-bone ridge, running from near the north-east corner of the state, a south-west course, passing near Dangerfield, Gilmer, Tyler, and Palestine, through Leon county, and continuing in that direction, which abounds in iron ore. (See Map 4.) The spurs or branches from this extend out in different places, which spread out the iron ore region, manifesting itself in iron ore hills extensively, over what has been heretofore denominated the black-jack belt of country in Texas. It has proved to be of good quality in the upper edge of Marion county, where it has been worked. Extensive arrangements were being made at the close of the late civil war to work it in Cherokee and Anderson counties, which, however, were never perfected. It is very doubtful whether there is any stone coal in the vicinity of this ore, by which it can be smelted in furnaces. The railroads

that are made, and being made, will obviate that difficulty when capital and labor shall have been applied to develop this great source of wealth. In the high country, above the edge of the mountains and cross-timbers, great abundance of iron ore is reported to exist, and there it will be in close proximity to coal and lime to work it.

Rocks; for buildings, fences and other purposes.

(See Map 4.)

In the timbered portion of Texas, which is in the eastern and south-eastern parts of the state, the rocks are for the most part sand stone of some sort, which is not very much used for anything. The iron ore-sand stone, though rough, is valuable for coarse structures, such as the culverts in railroads. There is a very fine building rock, underlaying the red-lands of eastern Texas, which may be often seen cropping out of knobs and abrupt ridges. It is a shell-marl and clay cement, of yellow, grey color. It may be easily cut into shape when dug out from under the surface, and hardens when exposed to the air, or to heat. It is extensively used for chimneys, and for jams and backs of brick chimneys, and was the material with which was built the famous "old stone house," in Nacogdoches, which has stood for a hundred years without any apparent damage from exposure to the weather.

In the prairie portion of Texas, in the west and north-west parts of the state, the rocks are, for the most part, some species of limestone. Underlaying the soil of the black, limy belt below the mountains and cross-timbers, there is a bed of white, chalky lime rock, that may be seen in the channels of the streams, and sometimes most conspicuously cropping out of the bluff-shaped western margin of that belt, which, when seen at a distance, has the appearance of rows of white houses. It is sawed or cut with an axe, into shape, for building; and it hardens when exposed to the air, assuming a pale, yellowish color, and bears and preserves a good face. It is the material with which the outside of the capitol of the state at Austin is built. It has been used extensively for chimneys, though it does not stand the heat of the fire very well. It seems to lie in a continuous bed, and is very free from any extraneous particles, such as pebbles, shells, or earthy matter that would

Rocks—Gypsum, Clay, Marl & Sand.

discolor it, or change its uniformity. The only thing that has been noticed, as being incorporated in it, is a very heavy, hard, round ball, (perhaps a sulphate of iron) commonly called "a sulphur ball," often about the size of a hen's egg. (This is most striking evidence that this bed of cretaceous limestone was a gradual deposit beneath a deep, swift, and powerful current of water, that held the materials of which the bed is composed in solution,—the strength of the current being sufficient to cast out of its track every other substance, except these very heavy balls, which, from their weight, found a resting place within it.)

Above this bed of white, soft, cretaceous limestone, that is, up the country from it, the limestone rock becomes harder, and less white, being gray, and pale yellow; often approaching the appearance of coarse marble, which is used for building houses, chimneys, pavements, and fences. It requires to be put into shape with the hammer. It makes good white lime when burned. Some little idea of the vast amount of it may be acquired, by considering the fact, that the mountains above San Antonio, Austin and other places on that line, (which, though called mountains, are really nothing but the broken, precipitous edge of the high plains above), rise from the bottom to the top, by layers of flat rock, piled one upon the other in regular succession, and often of a thickness appropriate for building purposes, and for pavements. It is difficult to imagine how such a supply could be exhausted. Already it is beginning to find its way upon the railroads to other parts of the country, as an article of commerce. There is marble rock of different sorts, not far up the streams from the lower edge of the mountains, and in the variety found, there is, in the Colorado River above Austin, a most beautiful black marble. It is not to be doubted, from what we already know, that a geological exploration will give information of many other sorts of valuable rocks.

GYPSUM, CLAY, MARL AND SAND.

As indicated by the rocks, the timbered region of the east is characterized by earths of clay, sand, and marl of various sorts, and the prairie region of the west, by earths largely composed of limy materials. In both, however, an abundance

Gypsum, clay, marl and sand.

of materials is found for making good bricks. There is a great deal of superior fine clay, red, yellow and white, in many parts of eastern Texas, some of which has long been used for making jugs, crocks, and jars; and during the late war, rude plates, cups and saucers were made, and extensively used for a time; which shows what could be done in that field of enterprise, if we had to rely on our own resources.

In the west, going up the country from the black, limy belt, there are beds of gypsum in many localities, and, high up in the region of the "staked plain," there is reported to be the largest bed of it that is known, covering an area of three to four hundred miles square, extending from Texas up into New Mexico. When the Texas Pacific railroad shall have reached that region an immense mine of wealth will be opened in Texas, in the supply of plaster of Paris, and manures from that bed of gypsum alone.

Although clay and sand may not be otherwise useful, than as constituting a body of earth to collect, retain, and aid the chemical action of other materials for fertilization, there are, in most parts of Texas, sub-soils of clay, marls and other admixtures of clay, sand, lime, shells, and other earthy materials, that may be dug out, and upon being oxydized, and carbonized, by exposure to the atmosphere, or by being burned, will prove to be useful fertilizers at a cheap cost. Farmers, who have good clay sub-soils, must have noticed the increased fertility in their fields near clay roots, where the up-rooted trees have brought the sub-soil to the surface, and it has for several years been exposed to the atmosphere, and been intermixed by cultivation with the surface soil.

Indeed, as has been previously said, there is some sort of good fertilizing material under the soil of every farm, or tract of land, that is fertile, or that was originally fertile, that may be dug up and utilized as a manure. Some of them are very active, and produce their good results immediately, as is the case with the lime and cherty-lime substrata of the west, and the shell marl of the red-lands of the east. Others, partaking more of clay and sand, are slow, so that experiment and experience must discover the modes by which their efforts are to be hastened by artificial means, or by abstracting, as

Gypsum, clay, marl and sand.

doubtless they will, when there shall be a greater necessity in this country for a knowledge of agricultural chemistry and scientific culture.

There is an exception to the above rule of fertilizing substrata that it may be well to notice, for the better understanding of the rule itself, and which may be aptly illustrated by reference to tracts of country in the magnolia belt, running through the counties of Newton, Jasper, and on westwardly, on or about the line of 31 degrees north latitude.

The tracts referred to are what are called "hammock lands," overgrown with a large forest and a thick under-growth, that has supplanted the cane-brakes, that originally covered them. (Mr. John Bevill, the first settler of Jasper, told me many years ago, with a sort of frontier's-man pride, that he cut his way through a heavy cane-brake to where the town of Jasper is situated, where he then settled.) The sand of the soil is deep and coarse, and the sub-soil is a coarse sand, but slightly intermixed with a poor yellow clay, which is very similar to the earth upon which the long-leaf pine grows in the same neighborhood. As the result of such a conformation, it is very liable to wash into very deep gullies, and also has exceedingly active powers of evaporation, by which the fertilizing materials of the surface, being more volatile than the rest, escape into the air and hasten their exhaustion. They do not sink, as it is commonly supposed, but fly away upon the fast up-rising wings of the atmosphere. Notwithstanding this unusual combination of draw-backs to fertility, the surface soil consists of a deep, rich, sandy loam, that renders farms very productive for some years after they are first cleared and put into cultivation. In looking about for an explanation of this, it is found that these hammock lands are ridges usually situated from a few hundred yards to a mile or more wide, each side of beautiful clear streams, that are flush all the year round, which, by their continuous application of moisture along their course for centuries past, have converted what was evidently a pine forest into a magnificent growth of oak, magnolia, beach, sugar-maple, ash, holly, wild-peach, intertwined with clustering vines,—rivaling the tropics in the splendor and profusion of their deep green foliage; and thereby

have enriched the surface soil, by the intermixture and decay of vegetable matter. Other tracts of country, such as the blue-jack sand flats, further north in eastern and middle Texas, are subject more or less to the same draw-backs, without the same remunerative accompaniment of similar streams of water, but which are somewhat relieved from the disadvantage by a finer sand and an admixture of better clay sub-soil. Lands of this and like character, as well, perhaps, as the thin, shallow soiled post-oak lands with coarse, clay sub-soil, that may be seen in parts of southern Texas, are injured in their production, by being very deeply turned over with the plow, which makes them striking exceptions, in that regard, to any other sort of lands in Texas, where there is a richer sub-soil.

The great use of a good clay sub-soil in agriculture is, that it answers the double purpose of retaining the moisture that sinks into it, and holds it in store better than most other earths, to be drawn up by evaporation in dry and warm weather; and also sends up to the surface, in the process of evaporation, fertilizing materials, that are imbedded in it, in which the red clays are generally the richest. For the same reason, sub-soils of limy materials are very valuable in agriculture.

TIMBER, WOOD AND FENCING.

The line of division, between the prairies and forests of Texas, may, for all practical purposes, be indicated, by a line drawn from a point, thirty to fifty miles up Red River from the north-east corner of the state, to a point thirty miles west of Corpus Christi; though prairies will be found east, and south-east of that line, and bodies and strips of wood west of it.

POST-OAK.—On and near that line is usually found a broad belt of post-oak, which may well be deemed the principal fencing timber of the prairies, being found in bodies and strips, not only on that line, but in large bodies in the cross-timbers, and in many other places in most parts of Texas, except in the high plains of the far-west. This tree, in most of the states eastward of this, is tough, and hard to split into rails. Our prairie post-oak, strange to say, splits easily, and, what might seem equally strange, split cotton baskets are made

this country, though it may be too brittle for small carriages. That, however, has not been sufficiently tested, by using the young, vigorous growth, that is not so brittle as the old trees. The length of its durability is as yet unknown, as it has not yet been known to rot, though long used in wagons, especially in the felloes of the wheels; nor does it weather-wear, as oak or other timber, but after twenty years use, and exposure, it presents a smooth, undented, sleek surface, as if it had been freshly worked over with the plane. It is easily worked when green, though very hard when dry-seasoned. Perhaps the most remarkable of all of its extraordinary qualities is its freedom from shrinkage, by which it may be worked green as well as dry. The tire of a Bois D'Arc wheel never has to be removed and shortened, though it may stand in the rain and sunshine for years. It has, for some years back, been manufactured into wagons at Dallas and other places, and so excellent is it generally regarded, that the wood-work of a wagon sells for double the price of that made with other timber. It is being used for ties on the Texas Pacific railroad, for which a high price is paid. The seed has been distributed, as an article of sale, in this and other states, from which have been grown hedges. It will prove a failure for that purpose, except to guard against large stock, unless it is continually pruned down, simply because it is a tree, and, by its nature, aspires upwards, and is not a shrub that is content to nestle its spreading branches on and near the ground. It is said that its wood makes a good dye.

A rather lengthy notice has here been taken of this tree; because it is believed to be the most valuable timber of this country, for the purposes to which it is adapted, excelling all others in solidity and durability, for wagons and large carriages, equalling mahogany for furniture, useful for fencing-posts, railroad ties, and various other things; (not omitting walking sticks for old men, or others who display that article of utility or fancy,) and that from the facility of propagating and growing it, it must ere long attract attention, as a production for an extensive commerce in the timber-markets of the world. (See Map No. 5.)

LIVE-OAK.—There is no native live-oak in eastern Texas. The eastern margin of the belt of live-oak, running clear through Texas from south to north, and back up the country, and westwardly for a considerable distance, may be sufficiently indicated by a line drawn from the mouth of the Brazos River, northwardly in the direction of Fort Worth. Low down on and near the Brazos, Colorado, and perhaps other rivers of southern Texas, it grows large, with wide spreading branches, and much of it will be valuable for ship timber. As you go further up the country, it becomes less in size, and more scrubby, but is there valuable for fire-wood, as it burns well, and produces very great heat. A remarkable circumstance may be noticed, in relation to the facility with which this wood when dry, (as well as the elm, which also is plentiful in the west,) will slowly but certainly burn without a flame (one piece of it, by itself, being ignited,) until the entire piece is consumed; whereas, in eastern Texas, the oak and elm there grown require the aid of dry pine, or light-wood, or other such appliances, to make it burn at all, thereby, even the wood, in the process of burning, announcing the great difference in the dryness of the climate in the western and eastern portions of Texas.

PECAN.—This tree grows abundantly in the bottoms of the Trinity, and of other rivers west of that in Texas, and also in some places on and near other smaller streams. Its nuts are gathered, and have already become profitable, as an object of commerce. It is not perceived why many of our rich bottoms, that are too low for cultivation, might not be cleared up and planted in pecan trees with great profit, except that the time has not yet arrived for any of us to make so long a loan without the interest being annually paid. A good financier, (Frost Thorn, of Nacogdoches,) once said, that if he could restore the pecan trees that once stood upon his Red River plantation, (near Nachitoches in Louisiana) he would prefer them to his cotton farm. He must, of course, be understood, not that they would have yielded more money than the cotton farm, but more in proportion to the risk, and to the capital invested. Fruit growing in cultivated orchards, has

long since taught that lesson in the northern states and is slowly beginning to teach it here.

MUSQUITE.—This is emphatically the tree of the prairies of Texas. It is rapidly increasing, and spreading over them in many places. The old trees, standing often in clusters on the prairie, present, at a little distance, very much the appearance of an old neglected apple orchard. It, in its leaves and thorns, is something like the black-locust, and, like it, bears a bean which horses are fond of. The tree can die and dry up, but it seems almost impossible for it to decay. When dead and dry, its toughness and solidity remind one of buck's-horns. When ignited it makes a most intense heat, and is used, when used at all, principally for fuel; and will most likely prove to be the very best wood that can be grown in the west for fuel, when it shall become necessary there to engage in wood growing. It will prove to be a most valuable timber for carriages, chairs, and other small fabrics, when properly tried.

HEDGES.—One of the early necessities of Texas is a good material for hedges. The money-value of fences of the ordinary kind, whether made of rails or planks, during a century, is so great as to astonish any one who has not made some estimate of it. The difference between the expense of them and good permanent hedges, made out of the proper material, would build every farmer in the state a comfortable, neat dwelling, educate his children, work the roads of the neighborhoods, and build their school houses and churches. And should fencing for farms be abolished entirely by law, which will not be found practical in a sparsely settled country, still there will be a great deal of fencing required for lots, gardens, orchards, vineyards and pastures. The qualities to be sought in selecting the materials for hedges, are durability or longevity in growth; facility of propagation; a tendency to grow near the ground (as a shrub, not shedding its lower limbs, as it is the nature of most forest trees to do); and the production of thorns or stubbed branches. These requirements are met with to a considerable extent in the largest species of the prickly pear of western Texas, which will grow both in the dry and in the wet portions of the state, is easily kept from spreading,

is little or no expense in pruning, is adorned in spring with a flower, and bears fruit containing much saccharine matter, that may be made useful, and upon a necessity for it, it may be charred in the fire and fed to oxen. It is also said to have valuable medicinal properties. It may be too slow in its growth to make hedges quickly. Perhaps the most useful hedge growth that has been tried in Texas is the *Peracanthus*. It is a sort of dwarfish hawthorn. It grows as a shrub, clustering near the ground, and abounds in sharp thorns. It is easily trimmed and kept in proper shape and size for a hedge. It is also quite ornamental, having thick green foliage, with blossoms and red berries at the proper seasons. There is a great variety of scrubby hawthorns in eastern Texas, and of other thorny shrubs in western Texas, from which it is altogether probable that a proper selection can be made, when the wants of the country shall demand sufficient attention to the subject. I suggest the *Agrita* for a trial.

SUMAC of the red and white species grows abundantly; which, besides being a good dye in its berries, furnishes leaves, which, when dried in the shade and mixed with tobacco, makes the famous *Kinikinick*,—that fuming luxury of the American Indian, that solaced his taciturnity in his forest solitude. It is very pleasant for the white people now, who smoke their pipes.

PERSIMMON TREE.—This tree grows abundantly in eastern, middle and southern Texas. It seldom grows larger than an apple tree, though much taller. It bears a round, red fruit, larger than a common plum, and less than a common peach. It ripens just before frost in the fall, and is very sweet. It bears well when grown in an open place, especially around the edge of a pond, which is then almost certain to be a place of resort for boys in the day time, and of opossums at night. It makes a fine beer which retains the peculiar taste of the fruit. The seeds are large compared to the size of the fruit. This leads to a singular, if not very difficult, inquiry. If an old bottom field, rather wet for cultivation, is thrown out, there will, in one or two years, come up all over it millions of persimmon bushes. The same thing will sometimes occur in up-land fields with the *sassafras* whose seeds are also large. The

quære is, how do all these bushes germinate so soon? At an early day in Texas, at the hospitable mansion of a Methodist preacher, (Dr. Ford, of Newton county), the writer heard an interesting discussion on this subject by a number of itinerant clergymen, who gave their various observations and experiences upon it, in the different countries in which they had traveled. Besides the persimmon and sassafras, one told of having seen a spontaneous growth of tobacco, and another of poke-root, and another of something else, until they were brought to consider the text of Scripture: "And the earth brought forth grass and herb, yielding seed after his kind, and the tree yielding fruit, whose seed was in itself, after his kind." The *quære*, notwithstanding, still exists.

PAPAW TREE.—The papaw is a small tree growing in the mellow, sandy soil of the creek bottoms of the eastern border of Texas. It bears a large, round, long fruit, shaped something like the banana, that is much relished by children, being very sweet. Its wood, when dry, is very light,—the young trees making fine how-helves, simply by skinning them, which is easily done, as the bark peels off like that of the young hickory in the spring. The fruit, like that of the persimmon, has a large seed through it, which would render it easy to be propagated. It contains, also, like that of the persimmon, much saccharine matter, will make good beer and vinegar, and when distilled a most palatable liquor. When it shall be ascertained, (and fully practiced upon) that the true philosophy of life consists in moderation in the use of all the good and serviceable things of earth, enforced by moral self-restraint, some of our useless, sandy creek and river bottoms that overflow, may be cleared up and planted in pappaw and persimmon trees, as well as pecan trees, that will bring their crops of fruit annually, without the labor and expense of plowing, hoeing and fencing, and thereby, and by some such means, a large amount of lands in all parts of the country, may be utilized, that can never be cultivated in ordinary crops.

MAST.—We have, wherever there are forests, mast-bearing trees, both for sweet, and for bitter mast; and when it "hits," it fattens the hogs, and brings great quantities of pigeons and black-birds. It was in former times much depended on, but

now good farmers may be heard to say that "the best mast falls in the crib."

OTHER TREES, PLANTS AND FLOWERS.—There are in Texas walnut, cherry, sweet-gum, holly, besides pine, suitable for furniture; black-locusts, mulberry, cedar, boxwood, elm, red-oak, and water-oak for shade, ornament, and other uses. Indeed we have in Texas all the forest trees common to other states of the south, except chestnut and poplar trees, which, as a native growth, are not to be found in Texas at all. We have plenty of Chinkapin trees in eastern Texas, very much resembling chestnuts trees in its timbers and nuts, though it is not so large as the chestnut. There are a few places west of the Mississippi River, immediately near the edge of its bottom, where the poplar tree grows,—for instance on Crawley's ridge, in Arkansas, on Little River, on a ridge in the bottom near Evergreen, and on the Cortobla Bayou near Washington in Louisiana. It is believed that there are no wild crab-apple trees, or hazel-nut trees in this state. There are a great variety of wild plums, as the dwarf or hog plum, the common wild plum, also the slough plum; also of haw-trees, black and red, including the rare, large, red may-haw, that grows in ponds, and has the taste of the apple; also wild cherry, and the honey-locust, all of which trees, when they grow abundantly, are good indications for orchard-fruits. We have also wild strawberries, blackberries, dewberries, hurtleberries, wildcherries and mulberries. Of flowering trees, we have the magnificent evergreen magnolia, whose large white flower bursts forth amidst its sleek, green foliage to greet the coming summer with its delightful fragrance; the dogwood, and the white ash relieve the dark aspect of the leafless forest, when the first warmth of spring clothes them with robes of white flowers. There are also the red bud, honey-suckle, elder, haw, plum, black-locust, mountain-ivy, and many other flowering shrubs and vines. The forests, not covered with under-brush, and the open prairies teem with a rich profusion of flowers, of every imaginable color, during most of spring, summer and fall, some of which would be considered rarely beautiful, if cultivated in flower-gardens.

CORDAGE—BEAR GRASS.—Texas has had use for a great

Medicinal Trees, Plants and Vines—Wood Growing,

many ropes; and it is to be hoped she will not need so many hereafter. Bear grass grows in large bunches, and looks something like a coarse grass. It is usually found on deep, sandy ridges or flats. Its blades have a long, fine fiber, that would make the best of ropes. It has been used to hang meat and is very strong.

MEDICINAL TREES, PLANTS AND VINES.—We have a large variety of trees, shrubs, plants and vines, possessed of useful medicinal properties, as button willow, dog-wood, cherry, prickly-ash, black-haw, slippery-elm, sassafras, fever or flux-weed, wild camamile, bone-sett, sarsaparilla, mullin, yellow-dock, jerusalem-oak, polkberry, Jamestown weed, rattle snake's master, mayapple, and others. They were used by the Indians, and by the early settlers, before the time of drug stores, for the cure of the prevalent diseases of this country, for which many of them seem to be pre-eminently fitted; being one of the innumerable evidences of the wisdom and goodness of the Creator, in providing antidotes for all the ills to which man is subject from the natural causes surrounding him, in any locality.

WOOD GROWING.—When wood growing for fuel, and other purposes, shall become necessary in this country, the natural growth of each section will readily point out to the careful and intelligent observer, what will there best succeed. In most parts of Texas the China tree, the Tree of Paradise, the black-locust, catalpa, and the Bois D'Arc, will be found useful from their rapid growth, and facility of propagation. The China tree has many other useful qualities: Alive or dead it makes lasting fencing-posts. It furnishes a dense green shade until late in the fall, when the foliage of other trees fade and become thin. When sawed, it makes fine furniture of beautiful color. The inside bark of its roots make a good vermifuge. Its berries contain an oil, which, when mixed with lamp-black, makes a good, shiny blacking for shoes or harness. Its leaves, thrown in a crib, and scattered among the corn while it is being gathered, is a preventive against weevil. And last, though we should not make it least, it is beautiful to look upon, especially the umbrella china. The China and the black-locust, the catalpa and Bois D'Arc, may

be propagated by the seed. The Tree of Paradise will readily spread by the roots over an old field, when planted there. The China tree may be planted on the fence-row eight feet apart around a farm, and in a few years its body will serve for fence posts, and being kept topped twelve or fifteen feet high, its limbs will furnish fire-wood. This has been successfully tried in Louisiana, and is so obviously practicable, that the most prudent farmer might well venture to try the experiment in Texas.

It is probable that, in the western portion of Texas, the native musquite tree will be the most certain growth to supply wood, and it also can be propagated by the seed. The primitive forest of a country is worthy of a careful study, not only for the useful lessons in agriculture, but also for the expansive conceptions, and delightful sensations, to which it invites the contemplative mind; and also for the intrinsically useful lessons that it practically teaches to the careful observer. It has every diversity of color and shape, with its forms and brilliancy so mellowed and modified as to be pleasing to the eye, and gratifying to the sense of the beautiful. It lifts itself upwards from its mother earth, with its own self-developing process, by the tendency of the life-sap to climb to the top, and the consequent shedding of the lower limbs,—each tree in its growth, accommodating itself to its surrounding fellows, yet each struggling for self elevation and expansion, resulting all together in the presentation of one grand harmonious combination. The aged patriarch of the forest is seen to exhibit decay at the top; the sapling near by vigorously rises up, sending all its force through its slender form to the aspiring top,—first, to reach the unimpeded warmth and light, that, when reached, will then surely expand its growth, to supplant its declining seniors. Two trees, standing in close proximity, by mutual accommodation, will form but one in outline. These analogies to human life, and social existence,—too obvious to require specification, may be indefinitely multiplied; and they show that all growth, all development, all animate aggregations in combination, are dependent upon general laws of universal application.

The forest indicates the general character of the climate,

Wood Growing.

and of the soils. It shows where one spot is too wet, or another too dry for cultivation, and it gives accurate notice of the approach, arrival and passage of the seasons of the year. It will tell the farmer when to plant his crops, and that, too, with a reasonable certainty, not dependent upon speculation or plausible appearance. Take, for instance, a standard growth, (that is, in eastern Texas, we may select the red-oak as the tree commonly growing over the country,) its budding out will tell when to plant corn. The farmer may be misled, by a few days of open, bright weather, to suppose that spring-time has come, but not so with the tree, because it is moved to renewed life, and action, from its winter bound dormancy, by the general average warmth pervading the atmosphere and the earth. Thus it is, that we are continually finding, associated together, the beautiful, the elevating, and the useful, in the works of Nature.

CHAPTER VI.

NATURAL WEALTH AS FOUND IN ITS WATERS.

The natural wealth of Texas, as found in its waters. For common use—their quality in different parts of the country. Mineral waters of medicinal virtues. The sour lake, and Lampassas springs, &c. Salines in the east and in the west. Water power—very great in the west and some in the east. For navigation—extent and character of. Coast canal—its advantages and practicability. For fish, oysters, &c., very good.

Wild game. Buffalo and Elk disappeared. Deer, Turkeys, Prairie hens, Partridges, &c., Bears, Panthers, Wolves, &c., determine the natural fertility of a country—the reason. Other animals, and some beautiful birds.

Atmospheric benefits—in wind power, in health, in production of crops, and in increased capacity to labor physically and intellectually.

Canes and reeds, as food for stock and for market particularly in the south and east.

Grasses. For natural pastures. The musquite grass in the west; the milo grass in the east, and others. Why pasturage is so beneficial to a country, how it may be secured, and the immense profit it is and has been to western Texas. The reason why dry countries are the best for grazing.

There is still a variety of other things pertaining to the natural qualities and resources of Texas that deserve some further notice—consisting of its waters, for common use, for medicinal virtues, for making salt, for mechanical force, for navigation and for raising fish. And in the same connection some attention may be given to its atmospheric benefits, its native quadrupeds, birds, its canes and reeds, grasses and pests.

WATER FOR COMMON USE.

As a natural consequence of the prevailing rocks, earth and soil, the water of both springs and wells in the two great divisions of the state, is for the most part very different,—that in the east being mostly freestone, and that in the west, limestone.

In eastern Texas there are numerous springs, from the fact that the pulverization capacity of the earth, of both soil and sub-soil, being of a high order of excellence, the rain that

falls abundantly in the winter and spring can sink, so as to furnish an ample supply of water for the springs and wells during the whole year. The spring water generally is warmer than that of the wells, and is regarded as not so heathful. Neither can it be said to be very cold in summer. Much of it, particularly that of the wells, that are usually from twenty to thirty feet deep, is cool and palatable. Some of it is very pure and "soft," as indicated by its washing well. In some places it is "hard," and is tintured more or less with some mineral taste, partaking of the earth where it is situated. In the main, however, eastern Texas is a well watered country, it being practicable to dig wells in all parts of it where there are no springs to be used. In some portions of it, in the line of the "black-jack belt," there are wells of strong alum water, as in Houston, Smith, Upshur, and perhaps in other counties.

In the eastern and southern portions of the prairies of northern, middle and southern Texas, including the "black, limy belt," there are but few springs. The soil generally being of a firm, compact nature, composed more or less of limy materials, the rain-water cannot sink so deeply as it does in the timbered sections of the east, but either runs off, or is evaporated by the winds that almost continually fan the surface of the earth; and, therefore, that whole region is scarce of water, which induces a resort to wells, cisterns and tanks. Some of the well water is good; most of it, however, like that of the springs there, is too much affected by the limy earth; and some of the wells, in certain places, where gypsum or any other mineral substances are intermixed with the lime, furnish water that tastes (as well as I can imagine) very much as if the contents of an apothecary shop had been emptied into it, as was the case with the artesian well at Austin also. Leaving that region and approaching the mountains, there are some very large, bold running springs of pure lime water, that evidently come from some distant source, somewhat on the principle of the artesian well, whose water flows out of the top of the well. Amongst them may be mentioned the bluff spring at Waco, on the Brazos, the spring at Salado, the Barton springs near Austin, the San Marcus spring, and the spring near San Antonio. Most of the country, however,

above the lower edge of the mountains and cross-timbers, and south and south-west of San Antonio, there is a scarcity of water. High up on some of the branches of the Red River and Brazos, that come from the gypsum bed of that region, it is said to be disagreeably bitter, or brackishly bitter. Through all that high plain region there are springs and ponds, as indicated on our maps, and the more the country is explored the more good water has been found. It is now believed, also, that water can be got by digging shallow wells in most of that country.

MINERAL WATERS OF MEDICINAL VIRTUES.

There are chalybeate springs in most parts of eastern Texas. There are sulphur springs in Lampassas, Grimes, Sabine, Smith, Upshur, Rusk and Cass counties, and perhaps in many other counties of Texas. There is the Sour Lake in Hardin, and the sour spring in Sabine county, and a sour well in Caldwell county, south of Austin.

The sour lake is situated on the level gulf prairie, between the Neches and Trinity Rivers, and its waters are regarded to be highly remedial in cutaneous diseases, chronic sores, and the like. It has been a place of considerable resort for a number of years past in the summer season. The Lampassas springs, situated about seventy-five or eighty miles northwardly from Austin, and about the same distance westwardly from Waco, is perhaps the largest body of sulphur water in the United States, and is said to be of good quality. Located in an elevated region of high hills and plains, and beautiful valleys, distant from any large water courses, and free from all miasmatic influences, with a free circulation of pure, dry atmosphere, it must in time become one of the most celebrated watering places on this continent. It, with its surroundings, is particularly adapted to the wants of the careworn and debilitated merchant, and professional man of our southern coast cities, who will be almost certain to be rejuvenated by a season spent at the Lampassas springs. Nor will it be any the less beneficial to our ladies of the south, whose constitutions have been ener-

vated by their cares or pleasures, or by the too frequent habit of spending their whole lives in one locality. It has long been resorted to by invalids to some extent, almost every summer, though not as it deserves to be, for it is destined to become a fashionable resort.

SALINE WATERS.

There are quite a number of salines in eastern Texas. The Grand Saline, or as it has formerly been called, Jordan's Saline, in Van Zandt county, Steene Saline in the northern part of Smith county, Neches Saline near the Neches River, near the line between Cherokee and Smith counties, and the Angelina Saline, in the southern part of Nacogdoches. They have all been worked, and the Grand Saline is still in operation. It is a flat, level basin, about a mile square, and shallow wells can be sunk in almost any part of it that furnishes salt water, and some of them are very strongly impregnated with salt. During the late war there were thirty or forty furnaces in full blast upon this saline; and furnished salt for a large section of the state. There are some ponds or lakes in south-western Texas, on or near the coast, which have been resorted to for salt from the earliest times in the settlement of Texas. The salt is deposited in them by evaporation, and when they dry up on the edges the salt is dug up from the bed of the lakes. There are also other salines in the up-country of western Texas which, however, have not as yet attracted much attention.

WATER POWER.

In western Texas the streams that run out of the mountains, and some of them that burst out at or near the foot of the mountains, furnish, as it is believed, a large amount of water power that could be easily brought into operation. Factories established there would have the great advantage of being in close proximity to the cotton, wool, and cheap provisions, and in a mild, dry, healthful climate where operatives could work with comfort every day in the year, and without the expense of fire, except a short time at intervals during winter. In south-eastern Texas, in the counties of Newton, Jasper, Tyler, and also in others in the same section, there are never failing streams, some of them large, bold creeks, that would

furnish a great deal of water power, in the midst of a cotton country, in which, also, at present there is a great deal of pine timber that could be sawed by them. There is water power now being used for "over-shot" mills and gins, on both sides of the Sabine River, in the counties of Smith, Rusk, Upshur, and Harrison. Indeed there can be water mills erected in most parts of the timbered portions of eastern Texas, and in early times most of the meal used in families was ground on them. The introduction of steam mills, of late years, has prevented their erection in many places where they could be erected. Water power for machinery, when it can be controlled properly, is by far the cheapest of any kind, and that which we have in Texas is (much of it) so fine, and connected with such extraneous advantages, that it must, before long, begin to be appreciated as very valuable to the country.

WATER FOR NAVIGATION.

Nearly all of our rivers, from the Sabine to the Rio Grande, are generally navigable for steamboats during about half the year, for a distance above their mouths,—some of them one hundred and fifty miles by land. There have been from time to time efforts made by the state to improve their navigation, mainly by having the over-hanging trees cut. Two reasons may be assigned why these rivers have never been as beneficial to commerce, nor as much used, as rivers of the same size in other countries. The first is, that usually their lowest stage of water is in the fall of the year, often continuing up to Christmas or longer, during which time cotton farmers get their cotton crop out, and desire to send it to market, or, if they sell it at home, country merchants cannot well delay the sending of it off to market. Secondly, that the ports, at the mouths of the rivers, are not generally such as would readily encourage the building of towns, or cities, of a size to become markets for the produce of the country. Galveston is, as yet, the only city upon our coast that can aspire to the position of a market, from which cotton is shipped to foreign ports direct. As the state becomes more densely settled, adjoining to those navigable rivers, the cheapness of water-transportation will certainly cause them to be used to much greater benefit than they have been.

COAST CANAL.

The line of bays upon our coast could easily be connected by canals, so as to have an inland channel of navigation from the mouth of the Rio Grande to that of the Sabine; which, indeed, might be extended to New Orleans and Mobile, and perhaps further. The saving in the diminished loss of coasting vessels, and in insurance, apart from the great advantage in time of war, would certainly be a large item in the commerce of this state. This project of an inland channel of navigation upon our coast has long been spoken of in Texas as desirable and practicable, but too large to be undertaken by Texas. The subject has lately been favorably presented to the congress of the United States, as one of national importance, and we may hope that it will be so deemed, when Texas has ceased to be a far-off-country, in a few years to come.

WATERS FOR RAISING FISH.

In the beautiful, clear creeks and other streams of the west, there are very fine fish, consisting of trout, blue cat, Gaspergew, and others. In the more sluggish streams of the east, there are the buffalo, yellow and blue cat, trout, sucker, and perch; and, perhaps, the finest of all of them is the large white perch. Fishes are more abundant in the rivers, and in the creeks near the rivers, as you go downwards from their heads towards the coast. It may be worthy of notice that during the summer of the year 1874 the agent for that service in the government of the United States, has deposited in the Brazos and Colorado Rivers, a large number of small shad-fish. Fishy importations into Texas have not heretofore been thought to be beneficial, but it is to be hoped that this one of real shad-fish will be more so. It is worthy of remark, that there is something in the soil, climate, and, it may be in the waters, too, of Texas, that exotics of any kind, imported into this country from a distance require a good, long acclimation before they succeed well, and many, even after that ordeal, entirely fail.

On our coast, we have turtles, oysters, crabs, lobsters, the red fish, flounders, and others, pronounced to be of good quality by those who are skilled in a knowledge of that sort

of diet. Occasionally a Jew-fish, weighing several hundred pounds, becomes stranded on the coast, and is taken by the fishermen, who sell it at a high price, as a great delicacy, as we learn from the newspapers that are almost certain to publish such an event.

Now, as fish diet is said, according to scientific investigations, to have been found to be one of the best foods for developing the brain, and consequently for fostering intellectual power, it might be well, on that account, as well as on account of the cheapness of raising or amusement in catching fish, to pay more attention to the subject than has heretofore been given to it in Texas. Dr. Franklin said, that the best hook to fish with was a silver hook. Patrick Henry, it seems, did not think so. However that may be, it is certain that most people like to eat fish, and that there is a reasonably good supply of them to be obtained in most of the settled portions of Texas. The Texas Legislature at the session of 1874 exhibited their due appreciation of this subject by the passage of a law to prevent the catching of fish, so as to retard their increase. Now we have a fish commissioner.

WILD GAME.

In common with other states, east and north of Texas, the Elk and the Bison, commonly called, "Buffalo," roamed over our forests and prairies formerly; but they have long since disappeared from the portions of the country which are settled. The deer is our largest game, and is still plentiful in eastern Texas and in some parts of the west. There are three modes of killing them, that have prevailed; one by fire-hunting in the dark nights, by shining their eyes, which was in early times much resorted to as a means of securing venison for food, and the hides for market. Another mode is that of still hunting by persons singly, which is the old Indian mode, the success of which depends much upon a stealthy step and a quick eye. White men have hardly ever reached the proficiency of the Indian in this; for the Indian does not load his gun until he sees the deer, and then practices his arts as a business, and not as a pastime, until he kills the game. The other mode is that of driving with hounds and horns; which mode is an English importation, in which usu-

ally a number of persons engage by taking stands at different places, where it is supposed the deer will run in the drive. It is a very exciting amusement, and is much practiced in the spring and summer, particularly in the timbered portions of Texas. When the deer get scarce in one section, the old hunters often get up a party of hunters, and go off a day's ride or further, and have what is called a camp-hunt for a week or more. Now that we have railroads, we may expect hunters from the older states to make raids upon our deer, and other game; and therefore it might be well to protect them, as well as the fish, during time of raising, if we desire to preserve the wild game of the state from extermination.

We have also turkeys, that are hunted at the break of day, in the early spring, which is the gobbling season. We have also partridges that raise about the farms, and are caught in nets. In the prairies we have also the prairie-hen, which is very similar to the partridge, except that it is in size about half way between a partridge and a tame guinea. Geese, brant, and ducks are abundant on our rivers, and near the coast in winter, and often wild geese may be seen in the green wheat fields in our prairies during the winter. Wild pigeons and black-birds, in large numbers, visit us in the fall and winter, wherever they can find acorns. The wild pigeons establish a roost to which they return at night, after having gone during the day a great distance in search of food. They continue to come long after dark, and crowd one upon another on the limbs of trees and bushes, so as to bend and even break them down; keeping up a noise all the time that makes the woods roar. Persons go with torches and sticks and kill as many as they want. In former times there were pigeon roosts in the pine woods in the western part of Upshur county, and near the line between Shelby and San Augustine counties.

We have a great many beautiful birds that make our forests and groves resonant with their music at certain seasons of the year, both day and night, particularly in the spring. Out of a great many that would interest the ornithologist, only four will be mentioned. The mocking bird, like the bee, follows civilization westward, and actually seems to await the opening of large farms, and the erection of good painted

houses, before they inhabit the country. The long-forked-tail bird of Paradise, (as it is called,) of the prairies, though not noted for singing, has a most varied and delicately beautiful plumage. Also the Chaparral cock of the west is a beautiful bird. It is very wild, and inclines to run off like a turkey, rather than fly, in escaping from your presence. The Parakeet of south-eastern Texas gives a harsh, grating squall in its rapid flight, always seen in small numbers, but never singly, dashing through and around the tops of the trees, is also a bird of beautiful colors of green and yellow or pale red.

Cities and towns on the gulf are well supplied with water-fowls in the market, those not having a fishy taste being distinguished by their not having black legs. It is much more agreeable to eat bird and fish separately; so it is turkey and wild onions. In parts of eastern Texas, beef and milk are both rendered unfit for use by the weed, as it is called, being, as it is supposed, something that cattle eat, but which has never yet been certainly ascertained. The taste of the milk that has the weed is not describable, because it is like nothing else to compare it with. It is simply bad; and so bad that the milk cannot be well used. It can be disguised by eating onions before drinking it. It is not known to be unhealthful when used. As to what it is, has long been and still is a mystery. We have bears, wolves, coons, opossums, squirrels, rabbits, foxes and peccaries or wild Mexican hogs. The hunting of the wild boar, so famous a sport in ancient times, and even yet in parts of Asia, was never very fascinating to Texans. These little hogs are very fierce, and when rallied pour out in a swarm from their dens often of large, hollow logs, and climbing a tree just then is a much better defence than spears, guns or dogs. It is something like fighting hornets, in which bravery is at a great disadvantage, and never wins laurels. Bears are fast disappearing as the cattle eat up the cane-brakes that they inhabit, to the great discontent of a few old remaining bear hunters, who now are left to fight their cane-brake battles over at their chimney corners, to the shuddering astonishment of younger folks. Fox-hunting, so inspiring in the old

countries, never took hold of the fancy of the youths of Texas to any great extent. Why should it? To follow that one must get up of a cold, frosty morning, two hours before daylight, mount a restless horse, blow a horn around through the woods, and if the hounds should make a start, and open out on trail, tear head-long through thickets and thorns, round and round, half frozen, lashed by the bushes and at last be held by others at a discount for not being up at the fight and death, five miles off, at sun up. Why not rather, in the pleasant part of the day, chase and larriat cattle and horses upon the open plain, for some useful purpose,—inter-mixing exhilarating exercise with practical business. Or if what is considered more genteel amusement be sought, there is the mule-eared rabbit of our prairies, that, with a pack of grey hounds after him, is so fleet as to fill the full measure of the idea, as commonly expressed, “of running like a blue streak.” This may be said to be the chief horse-back sport in western and northern Texas, in which many of our ladies as well as gentlemen delight to engage, as driving for deer is, as followed by the gentlemen in the east.

Attention is called to the great abundance of fishes, fowls, and quadrupeds both carnivorous and herbivorous, in part, to illustrate more fully the fact of the prolific fruitfulness of the natural productions of this country. Wolves, panthers, bears, cats and foxes do not live on air, nor can they live long in a barren desert. Their abundance or scarcity in any unsettled country is a correct index to its natural productiveness; simply because their subsistence depends upon the number of herbivorous animals, that can subsist during all seasons of the year.

ATMOSPHERE.

This may seem, to those who have not closely examined the subject, to be a strange item, in recounting the natural advantages of a country. Nevertheless it is true, that it has a positive value in Texas, not only as a power to be profitably used in machinery, but also in the personal comfort, health, and vigor of its inhabitants, in their power of protracting labor, either physical or intellectual, and even in the increased production of crops. This great advantage pertains peculiar-

ly to the prairie section, increasing in some of its beneficial effects, as in going north-west, the country gets higher and dryer.

Under the influence of the healthful, dry atmosphere of the high plains, interspersed with rich valleys in all that part of Texas, reaching far above the lower edge of the mountains, and cross-timbers, a vigorous race of men will be reared, who will some day largely control the destinies of this great state, and who, in their power, mental as well as physical, will demonstrate the fact, that a nation's wealth consists in the quality of men and women reared in it, as well as in the quality of its crops in agriculture. Suppose a factory should be erected upon any of the western streams that pour down from, or burst out of, the mountains, laborers in them, under the influence of the almost constant flow of pure, dry atmosphere, can labor with comfort from one to two hours in the day longer than they can east of the Mississippi River.

In intellectual labor the same benefit is readily appreciated. There is a marked difference in that respect, even between western and eastern Texas, off of the coast some distance. Leibeg, who is perhaps the highest authority in the science of agricultural chemistry, informs us that a very large proportion of all cultivated plants are built up by nutrition furnished by the instrumentality of the atmosphere. This principle is plainly illustrated in Texas, by the wild growth, as in the large cactus of the west. And it is on this principle, in part, that the very best wheat grown in Texas is upon the high, fertile ridges in the northern part of the state, where the wind sweeps over the growing grain in spring and early summer every day, relieving the soil from excessive moisture, which may then prevail, feeding the wheat in its passage, and stimulating the growth of the stalk and ear by the constant waving motion, which makes it so beautiful. And hence, exactly the same black, limy prairie soil, to be found in spots, and even in whole neighborhoods, (growing less as you go east,) in Washington, Grimes, Walker, Polk and Tyler counties, and where there is more timber, and a lower and more level surface, will not produce the same quantity of grain, perhaps on an average, by one-half. And, hence, the stagnation in the atmosphere,

by one-half. And, hence, the stagnation in the atmosphere, produced by a dense forest immediately north of a field, injures corn as much or more than the shade on the east or west side of it. And, hence, the great advantage that our farmers are well known to derive by planting their crops with good distance in the rows, by which the air has a free circulation between them. For this reason the rows should be planted wide as nearly in the direction of our spring and summer winds, (north and south,) as convenient. For a fuller appreciation of this benefit it may be added, that the rapidity in the circulation of atmosphere presses much more of it into the soil than if it were stagnant or sluggish, and by that means a more constant and abundant material is added to the soil, for the promotion of the necessary chemical action within it. This benefit, thus derived, may be redoubled, as experience verifies, by very deep plowing in the preparation of land for a crop, so as to permit the atmosphere the more deeply to penetrate the soil. It is important to be understood, that during most of the year the atmosphere flows over the surface of the earth from south to north; not only to render available some of the benefits heretofore indicated, but also to avoid some of the disadvantages that may result from it. It is for that reason, that in selecting a location for a residence the north or north-cast side of a river or creek bottom, or of a marsh of any sort, should be avoided; and preference should be given to the south side of a farm, rather than to the north side. Very high points of land have not proved to be very healthful, especially those that overlook large bottoms. Residences upon deep, sandy soils, as are often found in sand-flats, and in the pine woods, are generally not so healthful as those situated upon hard soil, or upon gravelly land. Residences should be generally constructed, in this state, so as to procure good ventilation from the south winds of summer, and to guard against the cold north winds of winter. A house, for a residence, should be placed on blocks or pillars not less than three feet high, so as to give a free circulation of the air under it. Houses placed near the ground almost invariably generate sickness, very often such as typhoid fever, especially where there is a damp surface.

CANE AND REEDS.

Forty years ago the river, creek, and even branch bottoms, in southern and eastern Texas, were overgrown with cane-brakes, or reed-brakes, the latter often covering the adjoining slopes of the ridges. They constituted largely, in the first settlement of those portions, the food for herds of horses and cattle during the winter and early spring. The stock has gradually destroyed them, except in those portions of the country where there have been but few settlers. A somewhat singular incident connected with their decline was, that when they bore seed they died, and often their places were occupied afterwards by a growth of bushes. Occasionally tracts of them have been fenced; so as to keep stock out during the growing season, by which they have been preserved as fine winter pastures. Stock are, however, liable to be sometimes killed by using it when frozen. Much of the reed-brakes might yet be preserved in many places by fencing. Cane might have been profitably exported upon our rivers of southeastern Texas, had enterprise been directed to it sufficiently, and even yet it could there be done to good profit by those who have no regular employment, if they should be willing to camp in the river bottoms in winter for that purpose.

GRASSES.

We have a great variety of native grasses, some of which are very valuable from their durability, and nutritive qualities. In all the timbered portions of the country grass somewhat similar to the prairie grass of the present day originally grew, except where the cane and reeds grew. The turf being broken by the tramping of the stock, its place is extensively occupied by thickets of under-brush, particularly adjacent to the farms. Still in most neighborhoods there is vacant territory sufficient for tolerably good summer range. For about twenty years past, the milo grass of eastern Texas has been gradually spreading westward from the eastern border of the state. It is a short, running grass that forms a strong mat of roots, that do not die out during the winter, and has in summer and fall a very small, slender stem that shoots up and bears a three-pronged head of seed of diminutive size. Its leaf is short and much broader than that of the Bermuda, or running

musquite. By its running process it is continually renewing itself, when fed down during spring, summer and fall, encircles and kills out all the worthless weeds that previously infested the ground, and prevents bushes from germinating where it has covered the surface. It is very nutritious, and very much liked by stock of all kinds, as horses, cattle and hogs. It has one great advantage over the Bermuda grass in the fact that it is not difficult to destroy it, when the land is attempted to be put in cultivation. It now occupies all of the thrown-out fields of our eastern border; and all that is necessary to get a good pasture of this most valuable milo grass in eastern Texas, is to turn out a field, or cut off the trees and bushes, so as to let the sunshine to the ground, to which must be added a little patience to see it spread. This is destined to be the permanent pasturage of that section, as the famous running musquite is of the west, and like it, tramping does not destroy it, as it does the grasses that grow in bunch-turfs, and not by running.

The musquite grass is a native of the far west, and is gradually spreading eastwardly over the prairies, rooting out weeds and supplanting the coarser bunch-turf grass, that is the common grass of the prairies, usually called, sedge grass, though it is very different from the sedge grass of the old worn out fields of other states. The musquite is a running grass, very much like the Bermuda in its appearance, and is extremely nutritious. This musquite grass is more permanently valuable to western Texas than all the cultivated crops that can ever grow upon the high-lands. It, without any labor bestowed upon it, feeds hundreds of thousands of cattle and horses, and fattens them for market in winter, as well as in summer. In the winter it is hay, cured and saved from a loss of its nutritious qualities by the dry fall season, and the general dryness of the climate and soil of that section. The rank gamma grass of the river bottoms, and other grasses common to be met with, are believed to be temporary, and unimportant, as, like the cane and reeds, they are giving way to the settlements.

There is a remarkable grass that has, within a few years past, made its appearance in the corn-fields, after the corn is

laid by, in the river bottom lands of the Colorado River near Austin. It grows up like millet, bears a large seed, and, when mowed, makes a fine hay of which stock, both cattle and horses, are very fond. It is sometimes called goose grass, from its supposed importation by wild geese, but it really has no name established generally, and from its advent here it should appropriately be called the Texas Colorado grass. It is probable it can be raised on the bottom lands of other rivers, and of creeks, and be made extremely useful, as it is said to be no impediment to the crop while growing and being cultivated; and by cutting and piling the corn-stalks, as soon as the corn is gathered, a heavy crop of good hay may be mowed and saved for winter use.

One of the great advantages of grass pastures consists in the great amount of green food and provender produced for stock without the labor and expense of cultivation. Another advantage, when it forms a dense mat of roots and blades on the surface, as does the milo grass of the east, and the musquite of the west, it prevents the land from deterioration by washing, and enriches the surface soil by there arresting the ascension of the mineral ingredients that are drawn up by heat, through the process of evaporation from the sub-soils, which, combining with the cast-off matter from the roots of the grass, that takes place in its annual renewals of its growth, gradually forms a rich surface soil.

It is often remarked, that our high, rich plains of the west would be a magnificent country, if there was only rain enough there to raise crops of corn and cotton with certainty. It is true that, in that event, it might support a denser population; but its real magnificence as a grand, natural grazing country would have departed with the permanence of good seasons, which would rot the grass in the winter, as is the case near our coast, and it would no longer have a good coat of nutritious hay, covering the surface of the earth, upon which stock can feed at will, as is now the case, by which fat cattle are sent to the market in the dead of winter from the plains and valleys three hundred miles up the Brazos and Colorado Rivers, while the cattle near the coast, where it is much warmer, are reeling with poverty,—poorly subsisting upon the

decayed grass, whose nutrition has been greatly impaired, and even almost entirely destroyed, by the excess of moisture there prevailing during that season of the year. And in that event, also, there would not, and could not be that health-producing atmosphere that now makes its inhabitants so robust a people.

Its true magnificence consists in a rich, limy soil, not subject to waste and impoverishment by evaporation, (as is the case in all wet countries) in a temperate climate, and in a pure, healthful atmosphere, and in its dryness, more than in any other quality. All these qualities combined invariably produce in a country a healthy, robust population, and are almost, if not quite, absolutely necessary to confer on it the benefit of a perpetual pasturage during all seasons of the year.

Where grapes grow well wheat and other small grains will grow with proper culture.

THE HIGH, DRY GRAZING PLAINS AND THE STAKED PLAIN.

In former times but little was known of these high plains, including the Staked Plain, and the country between the Pecos and Rio Grande rivers, except what could be learned from persons traveling across them on the routes to and from California, and from persons who were engaged in expeditions in pursuit of Indians, or from buffalo hunters.

Much of it has now been surveyed, and stockmen and others have passed over it more extensively, and experiments to some extent have been made in raising crops. It is now believed to be much better adapted to raising crops, and to be more seasonable, and to have much more water than was formerly thought. Where the grasses grow well and bear seeds from year to year, it may well be concluded that wheat, barley and other cereals can be grown by proper skill in cultivation when proper selections, adapted to the climate of the country, are made. One of the best evidences of the capacity of that whole plain-country to sustain a population, supported by the productions of the earth there, is, that it was for centuries past the habitation of millions of buffaloes, that subsisted upon its grasses, and got water from its pools, lakes, springs, and streams.

Though the population there supported may not be so dense as that farther east, still those who live there will have peculiar advantages in a healthful climate, in the production of the cereals, and permanent pasturage, in manufacturing facilities, and in mineral resources in the different parts of that extensive region of the state.

CHAPTER VII.

CULTIVATION OF CROPS.

Modes of cultivation of crops in Texas to obtain the advantages, and to relieve against the disadvantages, peculiar to the Texas climates and soils. Periods of the growth of different crops. How the excessive wet of spring and dryness of summer are to be guarded against.

The late frosts, their causes and effects, and how relieved against both in crops and orchard fruits. Some examples of successful farming in raising corn, cotton and potatoes, and the principles evolved therefrom. Adaptation of the different parts of the state to different crops and orchard fruits.

Orchards, their value and adaptation to, and mode of planting, pruning, and cultivating with the soils best adapted to them, and how the disadvantages of each section are to be remedied, and advantages of our climate turned to profit. Grapes, native and cultivated in different parts, adaptation to, uses of.

Horses and cattle, modes of raising in the past and present. Arts of horsemanship and of throwing the rope, necessary accomplishment, how attained and performed. Mexican saddle.

Swine. Modes of raising, past and present. Managed with hog-dogs, and how. Dependence on the masts, and how benefits obtained. Improved stock.

Sheep. Large section adapted to,—adaptation established. Profits of their best locality in a delightful country.

Farming with manures, fertilizers and improved implements, is an art in which there is much of science involved, and it is seldom resorted to in any country until the natural fertility of the virgin soil is considerably exhausted. It will likely, therefore, be some time before it will be a subject of great practical importance in Texas. Still there may be some cardinal principles in the cultivation of crops, and in the rearing of orchards and vineyards, as peculiarly applicable to this country, that it may be useful to point out.

The first question to be asked is, what can be profitably grown so as to remunerate the labor employed, and the capital expended? This must depend upon the character or kind of marketable production to which each section is best adapted, from its soil, climate, and means of transportation. These things run through the mind of the farmer, usually without much discussion, and take a direction in the first settle-

ment of a country, by the application of common sense to what can readily be seen, relating to the natural growth. Hence, it happened, that in eastern and southern Texas, the early settlers, as soon as their farms were opened, commenced to raise cotton; and those of the extreme west devoted themselves to raising stocks of cattle, sheep and horses, and of the north, wheat. The principal crops grown in Texas are wheat, corn, cotton and sweet potatoes. Sugar and sea Island cotton are raised to some extent on and near the coast. Irish potatoes, tomatoes, peas, beans, and most other vegetables of the garden, or of the field, are grown mainly for home consumption. In undertaking anything, we should endeavor to understand the materials we have to work with, the time and circumstances under which it must be done, and the objects to be attained.

It should therefore be borne in mind, in the investigation of the adaptability of crops to any particular section of Texas, that cotton is here a plant grown in the spring, summer, and fall; so are sweet potatoes; that corn is a spring and early summer plant, and wheat is a fall, winter and spring plant, reaching but slightly in its growth into the summer. Irish potatoes and most of the garden vegetables mature in the spring and early summer. Turnips are fall plants, as well as some other vegetables. It should be recollected, also, that in most of the farming portions of the state the winter, after the first of January, and the spring are usually very wet, the rain being rather in excess for farming well; that the summer and fall are generally dry, there not being enough rain then to sustain the prospect of the spring growth, by which the farmer very often suffers himself to be disappointed in his sanguine expectations. It is a universal rule, of both animal and vegetable productions, that the greatest maturity is attained by their growing during the whole of their season of growth, regularly and continuously, without either being stopped or retarded, or pushed forward too hastily at any period during that time. One of the most striking illustrations of these principles is to be found in the growth and maturity of the cotton plant in the south, during the full period of six months. And the reason why this great plain of the

Gulf slope is one of the best, if not the very best, cotton region of the world, is, that it is here usually practicable to continue its growth during that whole period without material injury from great excess or deficiency of heat, or from great excess or deficiency of moisture.

With these things plainly in view the problem to be solved is, how shall the cultivation of our ordinary crops be managed so as to be, as far as possible, relieved against the excessive moisture of spring and the dryness of summer, in the respective crops, that are planted each in reference to its season of growth. It must be understood that plants receive that part of their nourishment that comes from the soil, through the very small roots or rootlets that distribute themselves out in different directions from the main or principal roots; that their nourishment is prepared for reception by these rootlets by the chemical process which is carried on in the ground by the combination of the different materials in the earth; that this chemical process acts in its most beneficial manner, in a mellow, moist soil, and is stopped entirely, or greatly retarded, equally by an excess or by a deficiency of moisture, and also equally by an excess or deficiency of heat. Now one of the means (and a very efficient one) of preventing this cessation, or injurious retardation of the necessary chemical action produced by this excess of moisture usually in the spring, is by deep plowing in the preparation of the ground for a crop. In Texas this rule applies to all crops. It was a practice in states east of this, when the rains were more regular during the whole cropping season of the year, to plant cotton on a little hard ridge, left unbroken in bedding up the land. That, as well as many other things practiced in cultivation there, is wholly inapplicable here.

Deep plowing in the preparation of the ground for planting lets the rain water sink down deeply, and leaves the surface, where the young plant is rooted, much dryer than shallow plowing. The ground in the spring is generally colder than the atmosphere, and the warm rains of spring sink through the deeply-plowed ground and increase its general temperature in warmth, which is then so necessary to the growth of the plant. And if the ground is very level, or its soil of a na-

ture to retain the moisture at the surface, it should not only be plowed deeply, but it should be thrown up into high, broad ridges, with deep water furrows, so as to keep the roots of the plant out of the water, or, what is in effect the same thing, out of the wet, soggy earth, which increases the cold in the spring of the year, and prevents chemical action. The advantages of this, as a means of increasing the warmth of the earth, may be appreciated by considering the difficulty of warming any body by the action of heat downwards. We do not put fire on the top of a vessel to heat the water in it, but rather put it under the vessel. Again, a field of ten acres plowed nine inches deep is equal to a field of thirty acres, which is plowed only three inches deep, in the amount of material that is put to work to make a crop. Another advantage in deep plowing, so important to this country, is, that the water of the rains of the spring having thereby sunk deeply in the earth, instead of having run off and washed off a part of the soil with it, is stored away to be drawn back to the surface by the heat of the summer, when it is usually so much needed to sustain the growth of the crop.

Another means of drying the land in the spring, near the roots of the plant, is, by barring off the dirt from the planted rows with a plow, so as to let the warmth of the sun approach nearer the roots of the plants. This being, however, after the crop has been planted, and has come up, care must be taken in doing it in early spring, not to stir the soil about the roots of the plants any more than can be helped; for the reason, that stirring the land in early spring, near the young plants, increases the coldness of the soil in which they stand, by drawing the moisture and increasing the evaporation. This is often witnessed in the northern half of Texas, where, through the influence of the late northers, there is usually a frost early in April, (from the 5th to the 15th) which, if the corn land has been just plowed thoroughly, will injure and sometimes kill the young corn; whereas, that which has not been plowed, or which has only been barred off, so as not to stir the ground near the roots, has not been injured at all by the frost. And one reason why this late frost does not do more injury to young crops, and to small grain, than it really

does, is, that it is a surface cold, or, in other words, that it is produced by a coldness in the atmosphere, of so transient a character, that the general temperature of the earth is but slightly changed by it, and that only temporarily at the surface, being produced by a slight norther. If the ground has not been recently stirred near the roots of the plants, this surface cold will generally not reach low enough to change materially the temperature of the earth in their locality, and, therefore, though the top of the corn may be nipped by the frost, its roots being uninjured, it grows on nearly as if there had been no frost. Cotton at that season is more tender than corn, and, if up when the late frost comes, would be more seriously injured, if not killed, by it; and, therefore, in all the portions of Texas usually liable to late frost, the time of its planting should have reference to that anticipated frost in April, so as to escape its evil effects, or the danger of it.

Crops on high, rolling lands are seldom injured by the short cold spells of early spring, while those on bottoms, low, level lands, or stiff lands that incline to hold the moisture at the surface, are often injured by them, if not killed; unless by deep plowing or by high bedding before planting, or by barring off promptly and properly after planting, their ill effects are avoided.

After this cold spell of April is safely passed the plow cannot well be run too fast, or too often, in order to enable the soil and the atmosphere to press the crop forward, so as to be in good condition to meet and overcome the dry spell, or drouth, that may be anticipated in the last of spring or the first of summer, and sometimes in mid-summer. If the crop has thus been well put in and started off, care should be taken afterwards to use a sweep or harrow so as to break the roots of the crop as little as possible, consistently with it being kept clear of grass and weeds, which should never be suffered to grow in a crop during the period of its maturing.

If due preparation has not been made to meet that season of dryness and heat, a failure of the previously glowing prospects of a crop must necessarily ensue. And this leads us to consider another means of securing a good crop, besides deep plowing before planting, which is, that of giving the

crop a long distance between rows, and of thinning it out to a stand that the soil is capable of sustaining properly, during the dry season of summer. This is perhaps the most difficult task that the farmer has to perform, and has heretofore been as much, and perhaps more, neglected, or disregarded, in this country, as has the deep plowing before planting. For though it is often said, "that a crop must be cultivated before it is planted," it is seldom said or acted upon, "that only so much crop should be allowed to stand on the ground, as it is able to sustain in the dry season of summer." The difficulties in this are, first, those who have learned, or imitate, the cultivation of other states east of us, are apt to regard it as a mere waste of land to give sufficient distance between the rows in laying them off; and secondly, at the usual time of thinning the crop the plants are growing so thriftily, and look so flourishing and green, that it is hard to believe that they will not continue to do so; and, amidst their profusion of life and vigor, it actually requires a sort of stubborn hardihood, upon cold calculation and conviction of necessity, then not easily reached, to pull or cut up one-half as many of the stalks of corn or cotton as ought to be taken up to thin it enough. The consequence is, that as many stalks are left on the ground, as the land would be able to make bear ears, or bolls, if the moisture of spring continued during the summer, and the land retained the fertility with which it set out in the spring. It would be purely accidental in this country if either or both of these things should happen in any year; which long experience has demonstrated to an absolute certainty. Why, then, leave any more crop on the ground than that which can reasonably be expected to grow and mature, during an ordinarily dry season? A farmer, who had food for three horses only, would be considered unwise to feed it to nine, or even to six, under the expectation of keeping them in good condition. Our spring season gives promise, invariably almost, of twice the crop of corn and cotton that the summer can possibly yield, unless it should happen to be a rare exception to the general rule in the amount of rain-fall. By way of elucidating this much neglected subject, it may be asked, what is the end to be attained in planting corn and cot-

ton? To which, it may be answered, that it is to make good ears of corn, and good bolls of cotton, rather than large stalks without the good ears and bolls. Now if the fertility of the soil be exhausted in producing a super-abundance of stalks, it cannot produce good ears and bolls. But more than that, the earth will be true to itself, in its own laws of action, and if there is imposed on it the burden of producing a super-abundance of stalks consisting of mainstems, branches and leaves, it will, when the dry season overtakes it, struggle on with its load, and do its best to keep filled with vitality every leaf and branch with which the moisture of spring has crowded the stems, and will not leave that off to make ears, in the case of corn, and bolls, in the case of cotton; but will only make such an amount of ears and bolls as may be within its power, after sustaining, as best it may, that which had been previously produced in the shape of stems, branches and leaves. Therefore it is, that we sometimes see a fine field of well grown stalks of corn, whose shoots have good shucks with but little grain; and of well grown stalks of cotton with but few bolls, and they not well developed. This is rarely, if ever, seen where it is complained that there is only half a stand, which indeed, though said to be only half a stand, is often stand enough to produce well. One reason of the necessity of good distance in the plants of crops, both between and in the rows, is, that, by that means there not only will be a sufficient moisture and fertility in the soil to sustain them in dry weather, but, also, the air and the light can properly perform their offices in vegetable production; which they cannot do in crowded crops. This may be readily seen in cotton, which grows with a tap-root and branches like a tree. And the principle sought to be enforced here is verified in every orchard, and in the native forests, where it may be seen that the trees that grow in thick clusters, so as to prevent the free circulation of the air and the admission of the light to all parts of them, will bear little or no fruit; and that which is found in the densely-shaded parts of the trees will be deficient in full development. This is very conspicuous in the trees on the edges of the prairies in the numerous acorns they bear, compared with trees off in the adjoining

thick forests; and also where a hickory-nut or walnut tree is left in an open place about a farm.

Another means of preventing the ill effects of the dry season of our summers upon crops, is, by preventing the growth of young grass and weeds amongst it, until the crop is fully matured. The crop, especially of corn, is usually laid by, and let grow up in grass and weeds, more or less, that often attain considerable growth during the time the crop is struggling to reach its maturity in the midst of the dry season. The moisture and fertility of the soil, that are required to produce the growth of grass and weeds, is exactly that which has been lost to the crop during the earing time in corn, and the bolling time in cotton, which is the time, above all others, that the natural resources of the earth should be husbanded for the use of the crop. To appreciate the full force of this, it must be understood that the vigorous young grass and weeds, springing up in the previously well-tilled ground, are more active in searching for and appropriating the remaining moisture and fertility of the soil, than the older plants, constituting the crop; just as may be seen in our forests, where the young trees are growing thickly amidst the old trees, stopping the growth of the older ones, causing them gradually to die off and decay, by absorbing from the earth and air the sustenance by which they formerly flourished in vigor. Again, we find an advantage in wide rows in planting, by its taking less plowing in the spring to keep the ground clear of grass and weeds, and by means of sweeps or harrows, keeping them down in the summer, without injuring the plants. And if the good season should continue during the summer, by a rare accident, the space will be needed for the unusually large growth of the plant. Some of the very best crops of corn and cotton have been made on ordinary up-lands in Texas, when the rows were planted five, and even six and seven feet apart. To get the full benefit of wide rows, as has been remarked in another place for the reason there assigned, they should be laid off as nearly as practicable, in the direction of north and south, which is the direction of our prevalent winds in the spring and summer seasons of the year.

Crops planted in rows north and south, not only derive

greater benefit from the increased circulation of the air, but the plants shade the ground at their roots at the hottest time of the day, which is no little advantage during a dry, hot summer. It may not be improper, also, to state the fact, that a person is less exhausted by the heat in plowing north and south, than east and west; as in the latter case the sun is pouring its heat upon his back on every round during most of the day.

It is not designed to do more here, than to point out some of the means to be used in the cultivation of crops by which the advantages may be realized, and the disadvantages obviated, which are dependent to a great extent, upon the peculiarities of our climate, and which it is believed will consist, in the main, in deep plowing or sub-soiling in the preparation for a crop, and such other means as will promote dryness and warmth in the spring, in wide rows, thinned out to such a stand, as the usually dry season in the summer will mature well; and in shallow plowing or harrowing of the ground, after the early spring has passed, so as to keep down the grass and weeds, without breaking the roots of the growing crop until the crop shall have been properly matured. The same facts and principles may be applied to the cultivation of other crops, besides corn and cotton, if the time of the year adapted to their respective growth and maturity be taken into consideration.

It may be of practical advantage to give some examples of the modes that have been successfully adopted in raising the ordinary crops. General Pitts, who lived many years on the San Marcos in western Texas, was heard to say that he never failed to make corn there, even in the dryest seasons, and when asked how he made it, his terse reply was, "by deep plowing."

The Fullerlove mode of making corn with seven furrows after planting, is as follows, to wit: Early in the spring, just before the time for planting, a piece of land is selected which has been well cultivated in cotton the preceding year; three furrows are run deeply in the middle of the rows with a scooter plow, upon which a bed is thrown with a turning plow, just as land is prepared for planting cotton. A straight

row is run in the middle of the bed with a very small plow, into which the corn is dropped, and covered by running one or two furrows. The more exactly straight the corn can be put in the drill, the easier it will be cultivated. When the corn has sprouted and is ready to come up, the top of the ridge is knocked off with a board so as to allow the corn to come up in a smooth, clean surface. Now the seven furrows are commenced to be made by barring off each side of the corn with a turning plow, shortly after it comes up. The effect of this is to keep the little ridge upon which the corn is standing, warm and dry, should there be an excess of rain, which is usually the case at that season. Before the roots of the corn shall protrude from the little ridge, the dirt is thrown back to the corn with a turning plow, so as to cover up any grass or weeds that may have come up in the drill. By this means the corn is still kept on a ridge, with furrows each side of it, sufficiently near and deep to draw off from it the excess of water that may have fallen. The next plowing is with a sweep, (after sowing peas,) three furrows of which will plow out the middle of the row, and throw more dirt to the corn. By this mode the roots of the corn are not broken at all, the corn is laid by very early, and the peas will be sown in time to get a good start before they are too much shaded by the corn. This admirable mode of raising corn is practicable only when the land has been previously well cultivated in cotton, or in something that required it to be kept clear of grass and weeds during the previous year. Mr. Fullerlove was a good farmer, and a respectable gentleman, who lived in De Soto Parish, in Louisiana, and cultivated black-jack and hickory ridge lands, very similar to the lands in eastern Texas, where his mode was extensively adopted with profit.

A successful farmer in Rusk county, (Mr. Baily) followed the plan of farming as follows: He cleared a farm of about two hundred and fifty acres, placed his gin house in the middle of it, around which he planted about one acre in corn, and all of the balance in cotton, except that he crossed his cotton rows in planting, with corn rows, twenty or thirty feet apart, and cultivated the corn with his cotton. He cultivated his cotton late, so as to prevent any grass or weeds from growing

in any part of the farm, during any year, and thereby it was easily kept clean every year. He had no cross fences to keep up. He gathered his corn after he gathered his cotton, except what he could gather near the turn-rows, along which his wagon would pass. He made plenty of corn for bread, and for his mules and hogs, and kept on hand no more live-stock of any kind, than what he could make useful to him in this mode of farming. He was emphatically a cotton farmer, and a successful one.

Another successful farmer was Dr. W. P. Wright, who combined science with experiment in farming, both in western and in eastern Texas. His plan deserves to be noticed. His mode of farming was dependent upon having plenty of cleared land, and cultivating his crops of corn and cotton almost entirely with the plow, as must be the case to a great degree in all successful farming in this country. He planted his corn or cotton, especially the latter, in drilled rows, six, seven, eight, and even ten feet apart;—leaving the cotton thick or thin in the drill, according to the strength of the land. During all the early part of the season he cultivated the crop in the drills, by plowing and chopping through them, and thinning out to a proper stand. When the middle of the row became foul with grass or weeds, he lapped it into two or three ridges with a turning plow, which required only half the time required for plowing out the middle, which is done later in the season, when the press of work is over; after which the crop of cotton may be kept clean with scrapes or harrows until frost in the fall. The principle of his theory is, that by the great width of the rows, one hand can cultivate double the usual quantity of land, and can keep it clean by horse-power until frost; and that at the same time the cotton will have plenty of room to spread, if there is plenty of rain during the season; and if there is not, the space will be needed to furnish moisture to the plants in the drill. The size of the stalks, the number and the weight of the bolls of cotton, and the amount of corn produced by this mode of planting in wide rows, will astonish any one, who has never witnessed the experiment.

A very great object with farmers, is, and should be, to dis-

pense with the vast amount of scraping or hoeing, formerly so much in use in making cotton. This can only be done by a most careful preparation in planting, and by a skillful selection, and use of plows. A practical instance of this may be related, where an intelligent mechanic, upon turning farmer, devised the means of cultivating sixty acres of nice ridge land in corn and cotton; by the help of his son, a boy, two mules, and by the use of plows and harrows almost entirely. It was done in the following manner:

He plowed his land thoroughly into ridges, and ran a harrow upon the ridges, until they were fully smooth. He then opened the ridges with a small plow, having affixed a piece of round wood to the back of the plow in such a way as to make a smooth surface in the plowed furrow, into which his well rolled seed fell when sown; and thereby the cotton and corn came up regularly in a perfectly straight row. It was then cultivated entirely with harrows, after the first plowing around the cotton and corn, with the exception of thinning out, which was done in a few days, by his two little girls. His crop, when gathered, was more valuable than that of a neighbor who employed four negro men, and with them cultivated better land in the usual mode with hoes and plows. This information was derived from the neighbor who was thus surpassed in farming by the ingenious mechanic.

These examples exhibit the advantages of keeping the ground clear of grass and weeds, from year to year, so as to prevent their seeds from maturing; of width in the rows, so as to prevent more crop from growing than can be sustained, during the whole season of its growth; of cultivating the crop almost entirely with plows, sweeps and harrows, and dispensing greatly with the use of the hoe, so much formerly, and now too much in use, and made necessary by the usual mode of farming; of deep plowing in preparing the land for planting, and in the early part of the season, and shallow plowing afterwards, continued late in the season. The effort of the intelligent farmer should be to combine all of these advantages, as far as possible, in the same crop.

An example of good wheat crops may be found upon the farms, situated upon the high, black, limy ridges in the prairies

of northern Texas where the exact condition of things is found that is most favorable to a crop of small grain; to wit: A limy soil, high and undulating ridges so as to obviate the usual excess of moisture in the spring of the year, and so as to be easily accessible to the winds that sweep over the growing grain, and prevent the stagnation of atmosphere in the field.

In raising sweet potatoes, which grow during spring, summer and fall, the land should be deeply broken up one way, and bedded up the other into high, broad ridges, upon which the slips should be planted, (without the ridge being drawn up to a point on top), so as to shed the falling water in the spring. Thus the plant gets the warmth from the falling rain water, and is still high enough above the level of the earth to be kept out of the soggy ground, produced by the superabundant rain of the spring. As summer approaches, and the vines begin to spread, they should be turned from side to side, and the ridges plowed into deeply, and thrown towards the plant, without covering up the vines, which should never be done. After this is done, but little culture is needed, except, that when the vines have covered the ground, a stick like a hoe handle should be run under the vines along the middle of the rows, so as to lift them up, and detach from the ground the little roots, that have shot down into the earth from the vines, out in the middle of the row, and on the side of the ridge, thereby giving the root in the ridge all of the sustenance derivable from the whole vine. They should not be dug until after or just before the first light frost in the fall. This mode is not only conformable to the true principles of cultivation, but it is that which is adopted by Mr. White, an experienced farmer in Texas, who has potatoes to sell every year and does not attribute it to "luck"

Irish potatoes, being usually in this climate a spring and early summer crop, should be planted upon high beds of rich, well pulverized soil. When they are planted deeply in the ridge, as is sometimes done, it renders the crop uncertain as to quantity, and makes them late in maturing. The earth should not be drawn up much on the stalks or vines, as that tends to produce the same result as deep planting. A sec-

ond crop may often be made by planting in August, or earlier in the summer if the season is favorable. By this late planting, seed for the next year may be made. When more is made in the early planting than can be used, one of the best modes of keeping them during the summer and fall, is to let them remain in the ridges where they have grown; and, in case of a long drouth, they may be better preserved by drawing up the earth on the ridges. This will often keep them sound even during the winter, far better than digging and housing them.

In seeking the best mode of cultivation, with reference to any crop that can be cultivated here, the time of the year within which it can best be grown, so as to arrive at full maturity, must be considered in connection with the probable character of the seasons, in reference to moisture and dryness, heat and cold, that may reasonably be anticipated during every part of the full period of its growth and maturity, so as to provide for helping Nature to do its work in production, on principles deduced from the works of Nature.

With the same object, as above indicated, some views will be presented on the subject of orchards in Texas.

There is a considerable difference in the adaptability of the different parts of Texas to the different sorts of orchard fruits, though fruits of some kinds grow well in each section. Oranges, with some protection, grow on the coast. Figs and pears grow well in southern Texas, and figs might be grown even in northern Texas, if properly protected from the spells of severe cold. In nearly all of the settled portions of Texas, pears, peaches, apples, and plums can be grown. Apples do well in the northern and north-eastern part of the state, as well as peaches, pears and plums, and are already being raised for market. Our ripe apples can be sent to St. Louis, and Chicago in the latter part of May or first of June, when their apple trees are scarcely out of bloom. This is the great advantage that we have in Texas in fruit-growing, as well as in raising wheat, and the orchardist as well as the wheat-raiser should improve this advantage by raising fruit and grain mostly for the earliest market season. It is hardly to be expected that we can ever compete with states further north

in the late fruits, either in quality or quantity, on account of our usually long, dry summers, that tend to produce a toughness in fruit, and often to diminish its full growth.

There is a very fine apple, called the bunch or orange apple, introduced and cultivated by Mr. Perdue of Smith county, which has to some extent been propagated in this state. It is here noticed on account of its peculiarities in growth and bearing. The tree grows in bunch shape, like the black-jack tree of the forest, with a very dark green foliage which so continues late in the season, after that of most other apple trees has faded. Its fruit is of good size, somewhat bell-shaped and reddish in color, and ripens during two months of summer, while there is still small, green, unripe fruit growing on the tree, presenting in that respect, as well as in its green foliage, the appearance of the orange tree. The fruit mellows on the tree and is very palatable, as well as beautiful. A remarkably large pear is being now propagated to some extent, (limited as yet) that has been introduced and cultivated by Mr. Zimri Tate of the same county. One produced by him and sent to the St. Louis fair in 1874, weighed over two pounds.

We have a number of orchard nurseries in different parts of the state, and much attention is being given to fruit-growing. The indications now are, that figs, pears and muscadines (scuppernong grapes) will succeed in the south and south-east; and that peaches, apples and grapes (as the Warren, Catawba, Clinton, &c.,) will succeed best in the middle, north and north-west parts of the state. Indeed, fruit, introduced here from other states, seems rather to improve in size and quality, when planted and cultivated in the section adapted to it, and, hence, we may in time have nurseries of fruit to supply ourselves, and even to sell trees and vines to other states.

One thing will always recommend our fruits, grapes, vegetables and grains of all kinds, which is their sweetness, or the large amount of saccharine matter which they contain, on account of our usually dry, sunny climate, during the season of their growth and maturity. Flour from our wheat will on that account be greatly preferred, as less liable to damage, by being exported across the water to foreign countries, when

our commerce shall have taken that direction. This quality in our fruits and vegetables should attract attention towards the kinds to be grown, and the improvement of them in such a manner as will commend them in market, on account of that peculiarity, and in addition to the early period of the year in which they can be brought to full maturity for market. And it may well be remarked here, that as soon as our railroads reach, and penetrate Mexico, a vast market will be open to our early fruits, vegetables and grain; and preparations may well now be made, by planting orchards and vineyards in Texas to meet that demand.

As my previous remarks, upon the cultivation of crops, were directed principally to corn and cotton, as the standing crops of the country, so now, it will be principally directed to the growth of peach, pear, fig and apple trees.

If any one will look at the growth of the forest trees in any particular locality in any part of this country, he will thereby perceive the standard and character of the growth of the fruit trees, grown in that locality. And in the same way, he may determine the fruit-bearing tendency of them. On our eastern border, and in south-eastern Texas, there is a tendency in fruit trees to grow too rapidly and thriftily in the production of wood, and consequently with a diminished tendency to fruit-bearing. Towards the west and north-west from that region, (as the moisture of the climate diminishes) there is a gradual tendency to diminish in wood growth, and to increase in fruit-bearing, until a line is reached where the dryness and heat of the climate operates to the prejudice of both wood growth and fruit-bearing. In all those sections, where dryness is the impediment to fruit-growing, irrigation must be resorted to, as it has been done with the most signal success at El Paso on the Rio Grande. Where irrigation was not absolutely necessary, other means might be resorted to, such as frequent deep plowing, and grafting upon roots of a larger and more thrifty growth. For instance, if a pear tree is found to grow there more thriftily and larger than the apple tree, then graft the apple tree upon the pear tree root.

The very reverse of this should be done in the extreme eastern and south-eastern moist portions of the state, where

all fruit trees, if practicable, should be dwarfed by being grafted upon a less and a slower growth; so as to increase the fruit-bearing, and diminish the wood growth. These two extremes being considered, will serve as a direction for selecting the location of an orchard, in the intermediate localities, by avoiding the seepy ground at the foot of a ridge, and the dry or gravelly knobs on the top of the ridge.

Our late frosts sometimes produce a failure in the crop of peaches, by catching the trees in full bloom. One means of preventing this misfortune, is, by plowing the orchard deeply once or twice before, and just at, blooming time; by which the ground is kept cold, and the blooming of the trees is delayed so as to miss the frost. Another, is to plant the orchard on the north side of a ridge, or on the top of a high hill, (the higher the better for that) by which the blooming time will be deferred. This damage to the fruit may be averted, or much lessened, by preparing, in advance, the means of keeping up slow, smouldering fires, well distributed in the orchard (during the nights that the frosts may be anticipated), by the smoke of which the atmosphere may be warmed. There is a good peach now being grown in the nursery of Dr. Yokum of Larissa, in Cherokee county, Texas, that blooms too late for the fruit to be killed by the frost of spring, that should demand particular attention by orchardists in Texas.

Provision should also be made for relief against the injury consequent upon our long, dry summers. To meet this necessity the rows should be laid off wide enough, north and south, to permit a free circulation of air, when the trees shall be grown. They should be at least twenty-five or thirty feet wide.

In addition to that, the tree should be made to grow with stalk or stem about three feet high, with branches in every direction, so as to keep the bunchy top well balanced, on and over the stem. This will prevent the sun from injuring the bark of the tree on the south side of it, will prevent it from being bent or blown down by storms, and will also cause the branches to grow upwards, instead of horizontally, and facilitate the plowing near the trees. This shape of a tree may

be produced by three prunings; the first, when the young tree is planted out, by cutting it off, leaving it three feet high **only**; the second, by cutting off the four or five branches that **have been** allowed to grow, leaving them about six inches long; and the third, by cutting the branches that come on the first branches, so as to leave them about six inches long, which will be just at the end of two years from the time of setting out the young tree. After that, the trimming, if any, should be mainly for the purpose of keeping the tree well balanced, or to get rid of any limbs that happen to incline downwards. The orchard should by all means be cultivated so as to keep out of it the weeds and grass that will absorb the moisture of the ground in summer, and will proportionately rob the trees of it.

The rearing of vineyards, and wine making, partake too much of the nature of scientific arts to justify any extended notice of the subjects as applicable to Texas at present. Wine has not been sufficiently adopted as a beverage in the United States as yet, to make its manufacture profitable here, in comparison with other productions that require less time and skill. Still, for table use and home consumption, even in making wine, the cultivation of the grape deserves attention. Most of the settled portions of Texas produce some kinds of grapes well. In the south and east the scuppernong grape, which is a species of muscadine, grows and bears well where other kinds would fail from too much moisture, in the time of maturing the fruit. It is a native of the low country of North Carolina, on or near the Atlantic Coast. (One vine covering ninety feet square; upon the premises of Mr. J. G. Woldret, in the city of Tyler, produced in one year (1873) twenty-eight gallons of good wine). The Warren grape, a native of Georgia, is a very small, thin-skinned, sweet grape which grows well, and is fine for table use, and also makes good wine. Both of these are good runners, and do not require pruning. The Catawba grape is said to be a native of Buncombe county in the mountains of North Carolina, and is one of our finest American grapes, both for eating and for making wine. It requires cultivation and much pruning. It grows and bears well in most parts of Texas, but is more sub-

ject to injury from excessive moisture in the maturing season, than the scuppernong. The Isabella is very much like the Catawba, in everything except the color, being dark brown, whereas the Catawba is a clear, greenish yellow color, when ripe. The Clinton and the Delaware are also good grapes, that can be grown here. The kinds of grapes that should be grown in each of the grand divisions of this state, are plainly indicated by the native grapes in each. In the line of counties on our eastern border, and in south-eastern Texas generally, the muscadine abounds. In all of that portion of country north and west of the regions just referred to, embracing what has been designated as the black-jack belt, the large post-oak or sand-hill grape abounds. In the prairies of the west, the Mustang grape abounds. It is a large, rough grape, not fit to eat, from a pungent quality pertaining to the skin of the fruit, but it makes a wine of good body, and a very superior brandy as has been said.

The post-oak grape of eastern Texas embraces many varieties, some of which are very palatable, and make an excellent wine. And if proper attention was given to the subject, it is believed that selections can be made from our own native grapes, that, if taken care of and cultivated, may be made a better and more durable grape for this climate, than any that have been brought here.

The El Paso grape, grown on the Rio Grande, at and near El Paso, is said to be one of the finest grapes in the world, both for table use, and for making wine. It is thought to be a foreign grape introduced by the Spanish Priests in the Missions where it was cultivated and irrigated. There it has the advantage of ripening under a clear, sunny sky, and dry climate, after having been properly supplied with moisture for its full growth, by artificial irrigation, which fills it with a rich, luscious juice of a delightful, sweet flavor. It, though long known, and of great repute, has as yet been spread but very little over the country.

The judgment of mankind, as evidenced by their practice, from the earliest ages, has favored the use of the grape, for its nutritive and stimulating qualities, as promotive of comfort, health, and temperance. Its cheapness and abundance,

so as to bring it into common use, not only for its own intrinsic merits, but also as a means of supplanting and excluding the use of harsher and stronger diet, and stimulants, should be sought as an object of public good. And in this again we see, in the fruitful capacity of this country to produce the grape, the bounteous provision of Nature to supply exactly that which is so much needed, and can be so innocently used, as the appropriate remedy for the enervating influence of our climate.

In the first settlement of all the inhabited portions of Texas, horses and cattle were raised without being fed at any time of the year. In the timbered parts the woods were open, being generally free from under-brush, and produced abundant grass for summer; and the rivers, creeks and branch bottoms, and the adjoining ridges, produced cane or reeds, that supplied them in the winter. There are still summer ranges for stock, though in many parts they are scanty on account of the space occupied by farms, and the thick under-growth of bushes which generally surrounds them. In the prairies the grass has been so fine that horses and cattle have always been, and still are, raised with but little other food than grass, if any other, even during the winter; though in all the portions of Texas settled to any considerable extent, the range is much broken up, and the large stocks both of horses and cattle are removed further west, out of the vicinity of the farming settlements; and as they are beaten back, it is the policy of the inhabitants to improve the quality of their stock, and prepare fenced pastures for them, which, from our mild climate and good soils, is destined to be a profitable business. The exuberance of rich pasturage here in early times gave to the cattle an enormously large size in bone, body and horns, with a prolificness that encouraged the early settlers to give much attention to raising cattle, and many of them to follow it as a regular business. They learned much of this from the Mexicans, who preceded them in throwing the rope in catching them, in marking and branding, in herding them, and in their management generally.

The mark and the brand of stock raisers were usually the only evidence of the ownership of their cattle running in the

range, and the mark and brand found on an animal was the means by which, and often the only means by which the owner would know it to be his. In the spring of the year, those in the same section would collect together and hunt over the range for cattle, drive them into pens, prepared for the purpose, mark and brand the calves that followed their mothers, the brand of the cow being the test of the brand that was to be put on the calf. From this pen they would be turned out in the range, or be divided out and driven home, to be milked for a few months, (rather to keep them gentle and to attach them to a particular range, than to improve their milking qualities, which, indeed, was a matter but little regarded, or attended to generally). Under such a system, the cattle of any one stock-raiser would scatter over a wide range in a few years, which made it necessary to raise horses to herd them, and thereby, one and the same person would have in the same range, both stocks of horses and stocks of cattle. In the raising and management of horses, also, much was learned from the Mexicans. Twenty or thirty, or even more, mares would be put together in the range with a stallion, that would act as their keeper and protector by keeping them together, and by driving off from them any stray horse that approached them. Large jacks would perform the same office. Thus both horses and mules were raised for use and for sale, with little other attention than branding, and occasionally looking after the herd, to see that it did not get too far out of its usual range. These horses being originally like the cattle, mostly of the Mexican stock, have been very much improved by an admixture with the American stock, (as it is called) from other states; so that instead of our stock of horses being Mexican ponies as formerly, they are often found to be large, fine horses; and the same improvement has been made in raising mules. Our stock laws have been passed from time to time, founded on, and with reference to, these old customs, in the modes of raising stock, and which have been with more or less modification continued down to the present time, in all parts of the state where stock-raising is followed as a business. To the prairies of Texas, this stock business has been the great reserve-stay against every adversity of drouths, or

of floods, in war or in peace. When the crops would fail from drouths, the cattle would be the fatter from the sweeter and more nutritious grasses, though browned into hay by the heat of the sun. If floods of rain came the cattle spread over a thousand hills, escaped the ruin that befell the farms, and was a standing resource to supply the wants and necessities of the people. The cattle of Texas has flowed out, as a continued and continually enlarging stream of wealth to other states, giving evidence of the immense resources of this state.

There are two very necessary personal accomplishments in the management of stock, according to the Texas plan, to wit: throwing the rope so as to catch animals running at full speed; and the other is, good horsemanship; both of which the Americans learned to a considerable extent from the Mexicans. To perform the first mentioned feat the person took a pliant rope, coiled at one end, and held it in the left hand, with a running noose in the other end, held in the right hand, and which, being whirled in a circle over the head, was thrown in such a manner as to let the animal sought to be caught run his head into the open noose end of the rope; then, holding on to the other end, it was tightened upon the neck of the animal by degrees in such a way as to stop its career. This is a description in its simplest mode, to which there are many variations; one of them is the training of the horse ridden to act in such a way as to throw down the animal caught, one end of the rope thrown being attached to the horn of the saddle.

Much of the success of the extraordinary horsemanship depends greatly upon the construction of the saddle, and of the loose, easy, erect manner in which the rider sits or stands in it. The stirrups instead of being placed forward, as in the English or old American saddle, so as to act as a sort of support for the feet and legs, and which, if the horse falls down, will raise the rider one-half foot off of the saddle and throw him clear over the horse's head, unless he can luckily throw himself back before he is hoisted from the saddle, are placed far back in the real Mexican saddle, so as, by a change of position of the feet in the stirrups, the rider either sits or stands in the saddle, without being removed from the seat,

Swine, how managed with hog-dogs.

and without changing the erect position of the body,—the seat being the pivot-point of the body and limbs, to which he holds himself by grasping the horn of the saddle with one hand, if necessary, but only for the moment. In this attitude the rider swings his whole person to and fro, or to the right or left on this pivot, to suit the motion of the horse, whether he falls forward or backward, or pitches, like the careering of a vessel amidst the waves of the sea, which our young prairie horses of the herds are almost certain to do until they are well broken. This improvement in the construction of the saddle was, to some extent, adopted in the McClellan saddle of the United States army.

SWINE.

Hogs were raised, in early times, almost entirely in the woods or around the farms, with little or no feed except what they got themselves, and in such cases the masts in the woods were relied on to fatten them for pork. It was necessary, however, to feed them, and pass about amongst them in the woods enough to keep them from going entirely wild, which they would certainly do if long neglected, particularly where there happened to be abundant masts, or other means of subsistence. One means of controlling them by the early settlers, and which in some places is still resorted to, was by having hog-dogs, regularly trained to hunt them up, and drive them to any place that was desired, even into the close pen at home. Such hogs, thus raised, roamed in gangs for mutual protection against wild varmints, such as wolves, panthers and cats; and when, by scenting or by tracking, the dog would find a bunch of them, he would bark at them, or perhaps pounce upon a small one, whose squeal would bring together all the rest with a noise that would give notice afar off of approaching aid in defense. The dog would soon lose his hold and retreat, so as to collect them in pursuit of him in a body, usually in the direction of his master, after which, he would run around them, barking at them, so as to keep them rallied together until his master should ride up near enough to see from the mark whether they were his or not. If one, more skittish than the rest, should break from the gang on his approach, the dog would take after it, and either catch it or head

it back to the gang again, when another rally would take place. Hogs, thus managed, soon learned the voice of their owners, and the bark of his dogs; and, unless when they became very wild they, when rallied, would come up grunting all around the horse, looking up in expectation of their usual feed of corn, which they were very apt to get, when the dog would lay down to rest at a respectful distance, until his master would start off and set him out in hunt of another gang of hogs. As good masts did not come, or "hit," as it is termed, every year, it was the policy to have on hand a large number of breeders, in different parts of the range, and when a good mast did come, close attention would be given them, so as to raise a large number of pork-hogs that year, which would be kept over from year to year, so as always to have some large hogs that would get fat enough to make pork in any year. It often happened that the large hogs, when the mast missed at one place, would be collected and driven to where there was mast, and there watched and attended to until they got fat, when they would be driven back and killed for pork. As the country settled up with farms, this primitive mode of raising meat gradually gave way in most sections of the country, and was supplanted by the ordinary mode of raising hogs around the farms, giving them the run of the pastures in the fall of the year, and fattening them with corn in pens in the winter; depending upon the masts only contingently, when they should be good enough to aid in raising and in fattening them. Since the war this mode, under the system of labor now prevalent in most of the cotton-growing portions of Texas, has proved a failure from want of attention, and from depredations upon those that are running out, that are fat; and, therefore, Texas, while abounding in the means of raising it, is actually buying her bacon, at an immense outlay of money, that must be drawn from the field crops annually produced, and at the same time losing the benefit of those natural products of the country, which would aid in raising hogs if the matter was properly attended to. Of late years improved breeds have been imported into the country, for the purpose of raising hogs upon the system of feeding entirely, as practiced in older states, and, from present indica-

tions, that mode is likely, under the existing circumstances, to supplant the others as the only one that is practicable in all the well-settled portions of the state.

Sheep-raising, like wine-making, may be said to be a scientific art, where it is attempted on a large scale for profit. A good deal of attention has been given to it in the western portion of the state. It has been pursued with eminent success by the late Mr. Kendall, and by others in the elevated, rugged country in the mountains of the west. From their experiments, and from the character of the climate and productions in all that high-grazing region, between the lower edge of the mountains and cross-timbers, and the "Staked Plain," and sweeping around from Red River to the Rio Grande, we have an immense area pre-eminently adapted to sheep-raising, that will ultimately make Texas wool and mutton, rival, if not excel, its beef or cotton. When that vast region shall be settled, its beautiful rich valleys covered with farms for small grains, vegetables and fruits, and with pastures for improved stock, and its mountains and plains used as grazing grounds for sheep, goats, horses and cattle; its churches and school-houses erected, and attended by an industrious, thrifty, healthful and vigorous people; the savage Indian banished, and his ravages and murders forgotten, it will be one of the most delightful abodes of man on earth.

CHAPTER VIII.

MODES OF TRAVEL.

Modes of transportation and travel—past and present,—in Texas.

Trains of pack mules, how managed.

Wagons, and horse and ox teams, how managed. The great benefits of the ox teams to Texas, in cheapness of cost and expense.

The two-horse wagons introduced since the war, and why.

Travel on horseback, in stages, and in private carriages and buggies,—rough roads.

Railroads—their extent and sudden construction, their great and varied advantages to Texas at present, and glowing prospects in the future. Must be the common mode of transportation throughout the civilized world, and why.

Steam-power and telegraph revolutionizing the industrial pursuits, and consequently the moral, social and political status of mankind, and raising them to a higher plane of civilization. Other anterior stages considered with their moving causes; discoveries of use for metals, gunpowder and printing press. The mainspring of civilization developed.

Manufactories—advantages of, and prospect of increasing, &c.

Individual wealth—modes of honorably acquiring it in Texas heretofore and now.

In the early settlement of Texas by the Mexicans, the only mode of transporting the commerce of the country was by trains of pack-mules. The mules were provided with pack-saddles tightly fastened upon them by girths and cruppers; and flour, iron, boxes or bales of dry goods, bags of silver and other articles were fastened upon the saddle, for which the mules were trained to get down upon their knees, or even lower. When packed they were turned loose in a drove, and one person going before, and another behind the drove, they followed each other in the road or trail. At night the mules were turned out to graze, and the drivers camped and kept watch over them by the side of the road. The "King's Highway," or as it was often called in eastern Texas, the "San Antonio Road," was the great thoroughfare through Texas from the Sabine to the Rio Grande, passing through Nacogdoches and San Antonio. It was nothing more than a

mule trail, the deep, narrow cut of which in the ground may yet be seen in many places in eastern, middle and western Texas.

As the Americans settled in the country, this mode gradually gave place to carts and wagons drawn by oxen, mules and horses, for which it became necessary to construct roads, ferries, and bridges. The ox teams may be said to have been for many years our principal mode of transportation. A team of two, three, and four yokes, was generally used for that purpose. The Mexicans tied the yokes to the horns of the oxen with raw-hide strings or straps, and drove the team without lines, by a "sharp stick;" but the Americans worked the yokes on the neck of the oxen, confined there with bows, and drove the team with the call of the voice and a long whip, and without lines, the driver walking usually about even with the heads of the tongue (or rear) yoke, so as to have full command of the team in making them pull, or hold back, as one or the other might be required. There is great art in the good training, and management of such a team, and it is a noticeable fact that the best ox drivers were generally men sedate in their manner, and rather slow in their motions and movements. These teams were both fed and grazed on the road, and their drivers camped out, which for the time made it a hard employment. The large growth of cattle in early times, and still in the west, has enabled us to have very fine ox teams at a cheap cost and small expense, which made them far preferable to horse and mule teams that had to be fed, without the advantage of grazing on the trip, and which required more care and attention. With the long delay in getting railroads, and the little reliance placed upon our rivers, the ox team, slow as it is, was of almost incalculable advantage to the people of Texas. Still, notwithstanding its cheap cost and little expense, this mode of transportation must have cost the people of Texas, upon an average during its prevalence, at least one-tenth or twentieth of all the produce which they carried to market, besides a great loss in the wear of teams, and in the injured health of the drivers, from the necessary hardship and exposure in such an occupation.

The ox teams, in all sections of the state that are traversed

by railroads, are fast being abandoned, and in their stead are being used two-horse, or two-mule teams, the wagons for which have been mostly supplied to us by the north-western states, an immense number having been brought here and sold. They answer the purpose of short, fast trips, and suit better the changed mode of farming in connection with railroad transportation.

The mode of travel in early times was entirely on horseback. The inhabitants generally were so averse to walking, even a small distance, that it was a common observation that "a man would walk two miles to get a horse to ride one." In traveling they generally went prepared to camp out, an old Texan being rarely caught without his blanket for protection, and rope to stake out his horse. After the roads were cut out, and the settlements enlarged, stages and hacks were introduced, and, before the late civil war, were spread all over the state, in which the riding was rough and slow, and often very laborious, as the passenger sometimes had to pay dearly by working and walking on his journey. Private carriages and buggies were resorted to, the use of which, however, was much discouraged by the rough roads, as the Texas people never did like to work their roads, and do not yet.

Such modes of travel are yet common in those districts of country where there are no railroads; but travelers are now entertained at farm houses in the country, and in hotels in the towns.

Our system of railroads has, as it were, leaped into existence within the last twenty years, simply because the time had arrived when the states, east and north of us, having been supplied with them, Texas was an open field for investment in their progress westward and southward,—a progress that must continue in every direction until inland transportation is the common mode throughout the civilized world.

Up to A. D. 1870, there had been but little progress in building railroads in Texas. They were very short routes, as shown by the heavy black lines in the railroad map, extending only five hundred miles. Since that time, and up to the present, they have been greatly extended, and new routes have been constructed, (or will be by January, 1882) as indi-

The extent and sudden construction of railroads.

have been constructed, (or will be by January, 1882) as indicated by the crossed lines in the map. Numerous other charters for roads have been taken out, many of which will doubtless be speedily built, as indicated by the dotted lines. Also, charters for roads running through other parts of the state have been secured, which are not laid down on our map. It will be observed that the roads are laid off so as to connect the gulf coast with the railroads reaching Red River from Arkansas and the Indian Territory, by several routes already, and by others in the course of construction. These are the International and Great Northern, the Houston and Texas Central, the Missouri, Kansas and Texas, and the Texas and St. Louis Narrow Gauge roads, with their connections. While these roads, for the past and present, serve greatly to carry the produce of Texas into markets north and north-east of Texas, it is only necessary for our Gulf ports to be made to have deep water, to convert those roads into feeders for the increased commerce flowing through our own ports.

In addition to these main lines we have others leading to our Texas Ports; as the East Texas to Sabine Pass; the Gulf Colorado and Santa Fee to Galveston; the Gulf and West Texas to Indianola; the Corpus Christi and Rio Grande, (lately changed to Texas and Mexican Railroad) leading to Corpus Christi. We have at least three railroads in Texas, that are designed to have connections that will make them thoroughfares between the Atlantic and Pacific Oceans, upon the shortest and most practicable routes, during all seasons of the year. These are the Texas and Pacific now rapidly being built towards El Paso on our western border; the International and Great Northern now rapidly approaching Laredo on the Rio Grande; the Southern Pacific (Huntingdon's road) coming from El Paso to meet the extension of the Galveston, Harrisburg and San Antonio railway. The two narrow gauge roads, to wit: Texas and St. Louis, and the Texas and Mexican, doubtless, also, are intended to form connections with roads going to the Pacific coast.

Thus Texas will not only be accommodated very soon with railroads in all parts of the state, but she will be in the center of the passage of an immense commerce from the Atlantic

erly opened, a cheaper water-transportation will be reached through her ports, by which the high-priced land-transportation in going both ways across the continent will be saved. The fact that water-transportation is, and always will be, cheaper than land-transportation, will make our Texas ports be sought on the route half-way across the continent in going both ways from the Atlantic to the Pacific Oceans. All that we will need to certainly secure that object are deep water on our bars, and facilities for handling the commerce.

The railroads now constructed extend over most of the settled portions of the state; and, therefore, most of its commerce is being transported to and from market by railroads, except the large droves of cattle and horses that are driven on foot to market. The saving, thereby, to the annual wealth of the state in the diminished expense of the transportation of its marketable produce, must be not less than one-third, and perhaps one-half, of the former expense, under the ox team mode of transportation. This supposed estimate does not include the advantages in the saving of time; in the wear of teams; of a quick market, in numerous articles thereby made marketable which were not so before; in the general impetus given to production and trade of all sorts, and in the gradual increase of population, labor and capital. All these increased advantages to the country, the railroads are gradually but certainly introducing. These and other advantages are not so ostensibly prominent yet as to have prevented much disappointment in the expectations of the people, as to the immediate effects of the making of railroads in this state. The reason of this is, that they expected too much immediate benefit in the enhancing the price of their lands, and in the cheapness of transportation; not appreciating fully the fact, that the price of lands must, in the main, depend on the demand for them; and that must depend upon the population, the labor and capital to profitably cultivate them; and, also, the fact that railroads having been built, as an investment of capital for profit, will not reduce the price of transportation to the lowest standard of which it is practically susceptible, until there are enough of them in different hands to produce competition.

But that these advantages, whether we see and feel them now or not, will flow in upon us with many more not enumerated, is as certain as that a people will follow their own interests in prosecuting their own pursuits. For the steam engine in its application to transportation, as well as the thousand other uses to which it has already been applied, is transcendently the greatest labor-saving invention that has ever been made. In its broad sweep, wherever it goes, it is revolutionizing the whole face of society in its industrial pursuits, and, as an ultimate though necessary consequence, in its social, moral and political status, giving everything pertaining to it an impetus unknown before, and making its advent into every country the beginning of a new era in human affairs, ascending upon a higher plane of civilization. Indeed, the main-spring of civilization is the discovery and application by man of the laws of the Creator, by which the animate and inanimate objects of Nature are made to increase the muscular power of man in the performance of useful work. To appreciate the correctness of this proposition, it must be considered that civilization has occupied three, and so far as we can know only three, well-defined stages above semi-barbarism. The first was attained by the discovery of the use of the metals which made man a farmer, and conferred upon him numerous consequent advantages over and above his previous wandering, tribal condition as hunter and herdsman. The second stage was attained by the discovery and the use of gunpowder, and of the printing press about the same period, which protected the mass of men in the peaceful pursuit of agriculture, by the use of arms in the hands of a few, and allowed the great body of the people to acquire a degree of learning and intelligence never by them attainable before, and largely increased the number of those who devoted themselves to the cultivation of the arts, sciences, and refinements of social life.

The third stage was attained, or, perhaps more properly it may be said, is now being attained, by the discovery and application of the power of the steam engine, and of the telegraph, which are giving to all human affairs a speed, intensity, and compass, never before conceived to be possible; which,

in their ultimate results, will produce a phase of social organization, not yet fully formed and developed, to a fixed determinate standard. Enough progress has, however, been made towards its full development to manifest some extraordinary changes in the previous condition of things, with their prominent tendencies; amongst which may be enumerated the increase in the ardent pursuit of individual wealth, and the rapid and large accumulations of it; the consequent demoralization in all the varied means of its acquisition, and the extravagant display of it; the increased tendency to the co-operative effort of labor, capital and mind in all enterprises directed towards material development, whether of a private or public character; and, (equally conspicuous with any other,) the marked tendency towards the centralization of political organizations. Now, notwithstanding that in the breaking up of old ideas and habits and modes of life, and a reconstruction of them upon another basis, many evils may follow in the train of events, still it is fair to conclude, that, as in each of the other periods of revolution that have been mentioned, society emerged from them on a higher plane or stage of civilization, so it must again be the case. It is easy now to anticipate with certainty the vast increase of wealth, intelligence and refinement that this power will soon spread broadcast over Texas, when it is contemplated that by it its marketable articles are greatly increased both in number and quality, and the facility of reaching the greater number of markets for its produce is largely increased; and that a large portion of the great and growing north-west will find through the center of Texas on different routes an outlet to, and ingress from the gulf; (the nearest salt water) and that the several Pacific railroads will, in a few years, open up through Texas the trade to and from the Pacific coast, unembarrassed by the snows of winter; and that the International railroad, being exactly on the track of the shortest line from the City of New York to the Pacific coast, and when completed, being, from the winds and currents of the oceans, in the very best line of communication by sailing vessels between western Asia and the United States, and western Europe, with the advantage of easy access to the gulf at the half-way passage

through the continent, and penetrating into the tropics in Mexico, will pour into and through Texas a rich stream of commerce, and open to her productions an expanse of trade on the value of which it is now difficult to make any approximate calculation.

MANUFACTORIES—A NECESSITY TO PERFECT OUR NATIONAL WEALTH.

Manufactories in every country have depended largely upon the amount of labor and surplus capital within it, as well as upon the facility of transporting the manufactured articles. In all these requisites, Texas has heretofore been deficient; consequently but little progress has been made. Still our condition in that respect is improving, and the cheapness of the materials and provisions here, with the advantages of our climate, must sooner or later invite capital and enterprise in that direction.

Now that we have railroad connections with the other states, we can begin to contemplate the advantages of establishing factories in Texas, particularly for cotton-spinning, leather, and for the manufacture of implements of husbandry, and for making railroad irons. For cotton-spinning factories we have a population well adapted since the war, on account of the large number of widows and children, who could be profitably employed in such business, if we had the necessary skill, capital and enterprise.

For tanning leather we have great facilities, (at least for making leather to be exported in a rough state) on account of the cheapness of hides and abundance of bark to be obtained in the clearing of farms, in the timbered sections of the state. Besides which, our climate will enable the process of tanning to be carried on during the whole year; and we have an abundance of good water for the purpose.

The railroads have already to some extent connected the good coal with the iron ore; both of which abound in this state, inviting labor and capital to profitable employment.

When these would be started, other connected industries would follow in their train, and Texas would have the benefits of manufacturing her own raw materials for export as well as home consumption.

INDIVIDUAL WEALTH.

As in the first chapter some views were presented, as to the process by which national wealth is acquired, so in conclusion it may be profitable to consider how individual wealth has been, and still may be, acquired in Texas. They depend upon very similar principles, labor being the foundation of both; and both being attained by the accumulation and perpetuation of labor, mental or physical, fixed or piled up in durable shapes, so as to continue to produce values.

It is now too often said, that the time is past to make fortunes in Texas. That is a great mistake of those who have not well considered the principles upon which substantial fortunes have been made here. Another injurious error is the supposition entertained, that fortunes have been made here by some good turn in one's private affairs, or what is called "good luck." It would be well for the world, perhaps, if all the real fruits of good luck, lotteries, swindling speculations, and other mere gambling operations could be thrown into the sea. Fortunes so made, apart from the demoralizing fascinations fraught with evil influences, are seldom permanent, under the homely adage, "come easy, go easy." It is a bubble as readily broken as blown. A fact that should discourage the wild hunt after such accumulations is, that there are very few men capable of retaining property that has not been acquired in some regular train of honest business of utility. The pursuit of a train of useful business presents a reasonable certainty of success to every one who will intelligently and persistently follow it in this state, and thereby avoid the numerous civil and criminal pitfalls of creeping chance, and vaulting luck. It is in such regular train of business that fortunes have generally been made in Texas, and so they will generally be made, wherever made and kept permanently.

As national wealth cannot arrive to any great magnitude by the labor of one generation, so individual wealth of great magnitude cannot be acquired by the labor, physical or intellectual, of one man, without the labor of others being added thereto, in the course of even a long life-time.

It is an easy matter for any young man, by reasonable industry and economy, to acquire a home in Texas and improve

it so as to acquire an independent living, rear a family, give them an ordinary education, and start his children in the world with advantages equal to his own, if not better. But suppose he should have an ambition to acquire a fortune beyond the condition of an independent citizen, living in his own home, by the sweat of his brow, then he must get up a train of business that will give him the advantage of the labor of others as well as of himself.

The problem is, how may this be done honorably, and without injustice to any one. This may be well illustrated by a few examples. There was a young man settled in a town in eastern Texas as a merchant, over forty years ago. He had a small capital, good business capacity, and great energy and foresight. He bought on a credit in New Orleans about ten thousand dollars worth of goods, and sold them out. The monetary crash came, and he could not collect the money. He converted his debts into land certificates, and had them well located, making his lands cost him less than twenty-five cents per acre. As immigrants came in, he sold at one dollar per acre, parts of his large tracts, and re-invested in other locations further out. Settlements were formed about and around his lands unsold, and then he got two, three, and finally five dollars per acre for his lands. In thirty-five years he was worth more than one-half a million of dollars. He had acquired this large amount while preserving the most honorable deportment in all of his transactions, and without hard exactions or litigation. It was by the simple process of getting the benefit of other person's labor in building up their own farms, and in making neighborhoods with churches and school-houses, around his own lands; thereby adding an increased value to his lands, as they increased that of their own. It was generally supposed that he was a good trader, whereas, in fact, he merely put himself in and persistently followed a legitimate train of business, and instead of oppressing any one by unreasonable exactions, and hard bargains, was an advantage to thousands of people by his liberal indulgence when necessary.

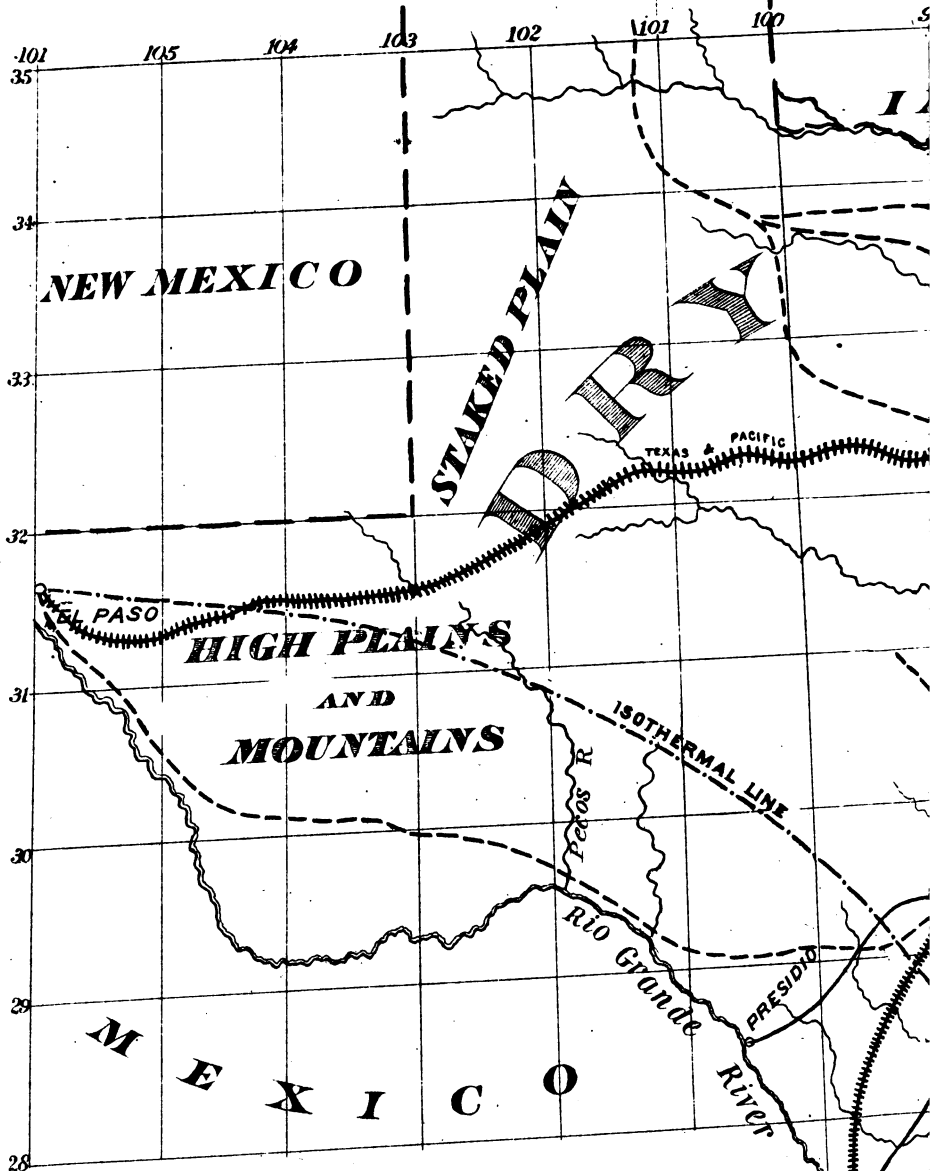
A similar result was attained by a professional man who settled in a town in Texas over thirty-five years ago; who in-

vested his surplus gains in lots and lands in and about the town. It is now a city, and he is a rich man,—made so, main'y by the brick and mortar put up on adjoining lots, or on those he sold off, by which the value of those retained has been increased.

Another more common case is that of a young man who came to Texas thirty-nine years ago with but little education, and no capacity for enterprise of any sort, except honesty, industry and economy. He hired himself to work by the month, and in a few years he had a good little farm on which he lived, and made a respectable living for himself and family, until his boys were able to add their labor to his. That gave him the idea of accumulation by the labor of others besides his own, and he acted on it. He is now the possessor of a large farm, and is one of the best and most thrifty farmers in his section of the state, and has been enabled to do a far better part by his children, than if they had grown up in idleness, or without a purpose. Yet that man, though in good circumstances, and respected by all of his neighbors as a good man and a good citizen, will go to one of his more learned neighbors to write a note for him, unless one of his children happens to be on hand to write it.

So it is in the trades and professions, as well as in agriculture, that the labor of others may benefit you in a legitimate business, while it is equally beneficial to them.

While, therefore, simple independence by one's own labor is and should be regarded as the honorable position of the Texan citizen, to which any good man may easily attain, an honorable road to fortune lies open to any one whose ambition leads in that direction, to his own and the public benefit.

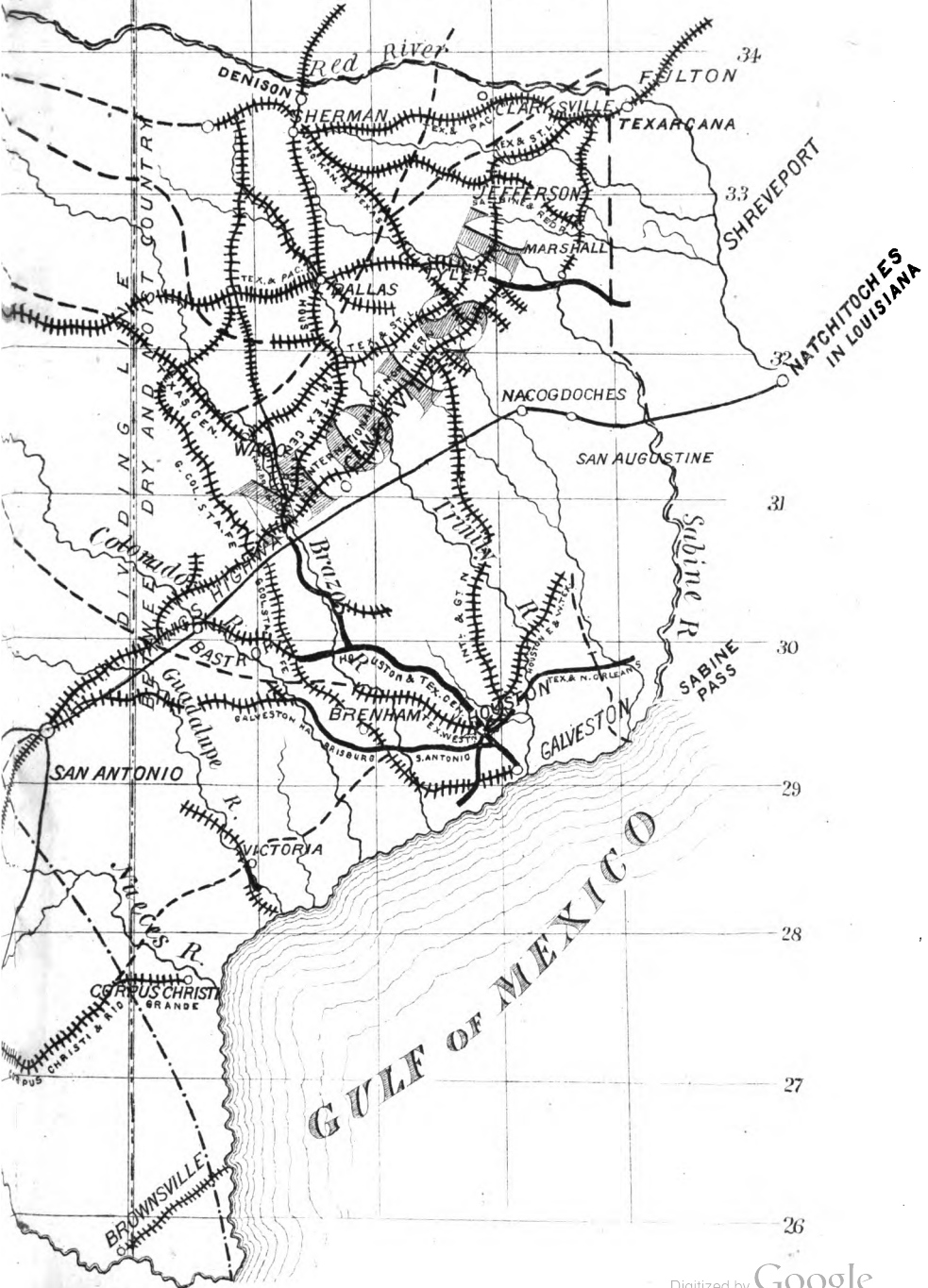


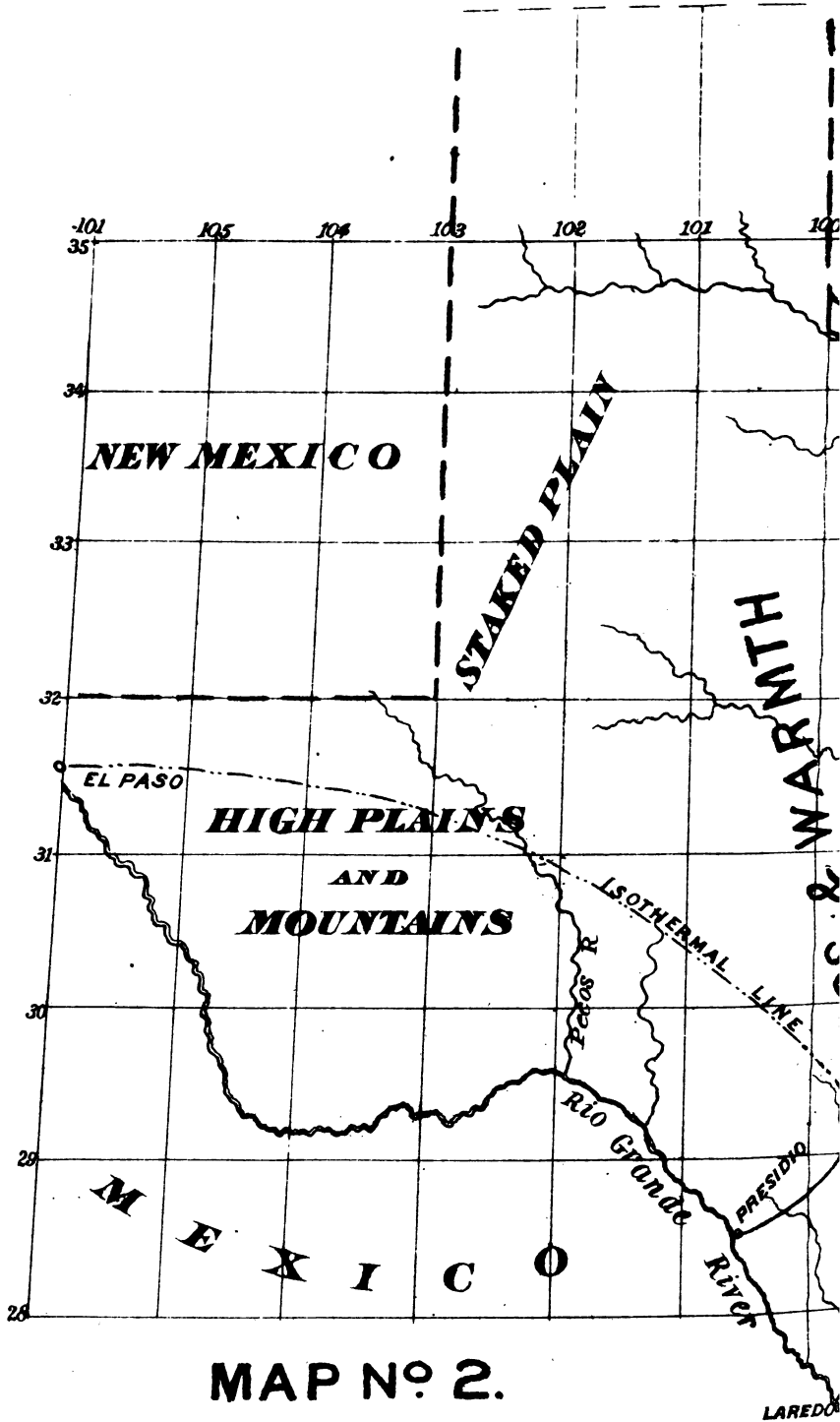
MAP NO 1

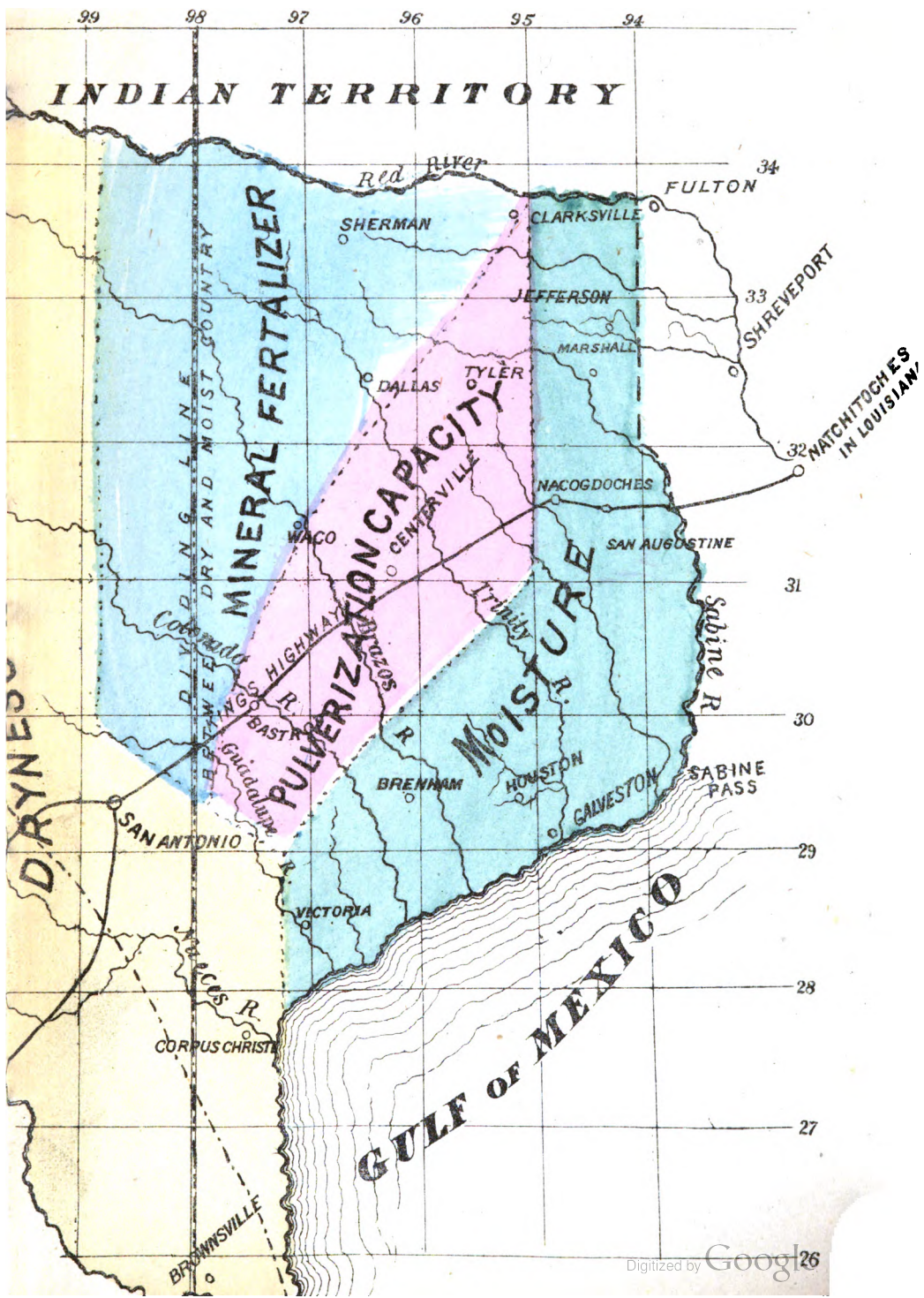
RAILROADS COMPLETED JAN. 1ST 1870
" " " " JULY 1881
IN COURSE OF CONSTRUCTION

98 97 96 95 94

INDIAN TERRITORY







INDIAN TERRITORY

MINERAL FERTILIZER

PULVERIZATION CAPACITY

MOISTURE

DRYNESS

GULF OF MEXICO

99 98 97 96 95 94

34 33 32 31 30 29 28 27

Red River

Colorado R.

Sabine R.

SAN ANTONIO

BRENNAM

HOUSTON

GALVESTON

VICTORIA

CORPUS CHRISTI

BROWNSVILLE

SHERMAN

CLARKSVILLE

FULTON

JEFFERSON

MARSHALL

DALLAS

TYLER

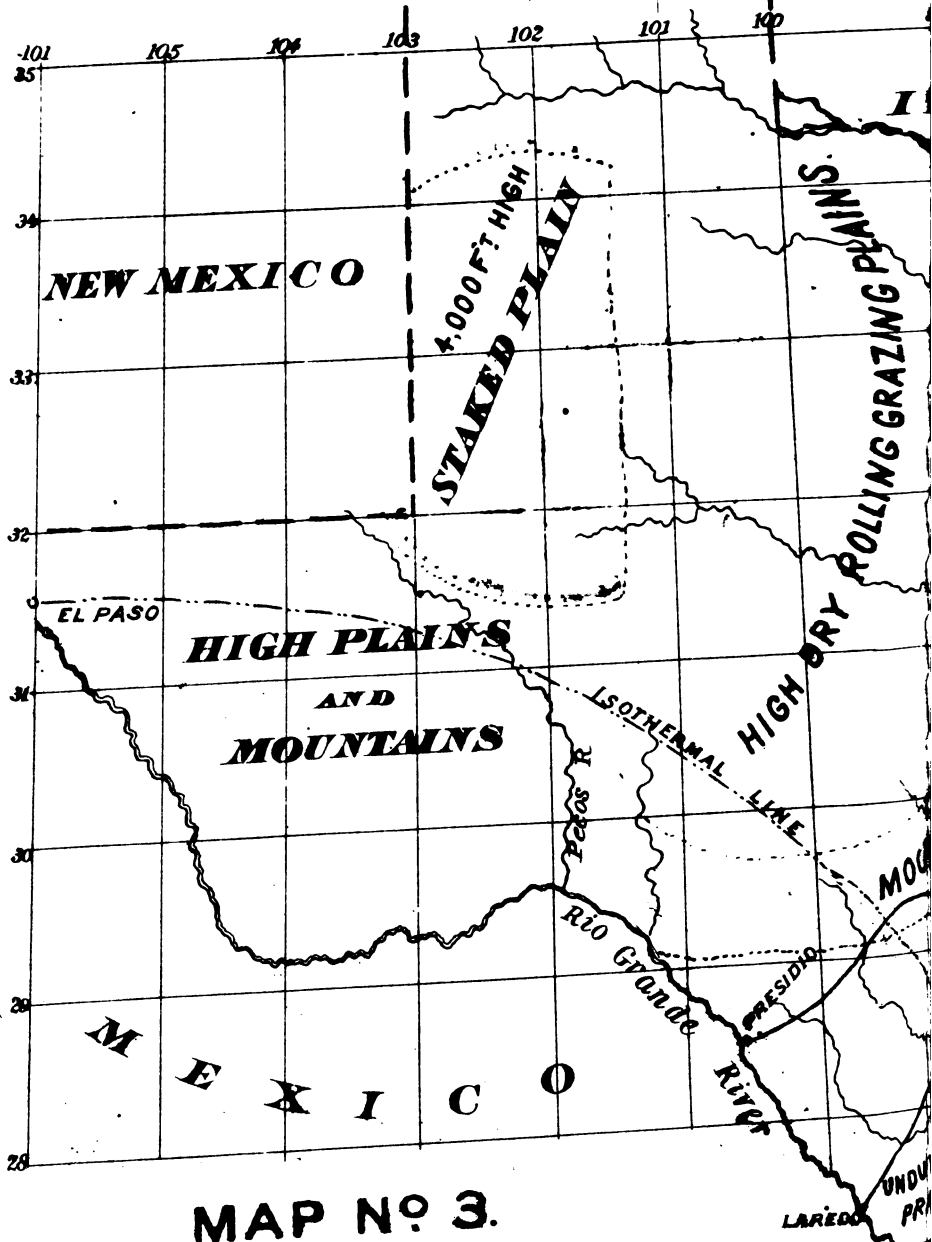
NACOGDOCHES

SAN AUGUSTINE

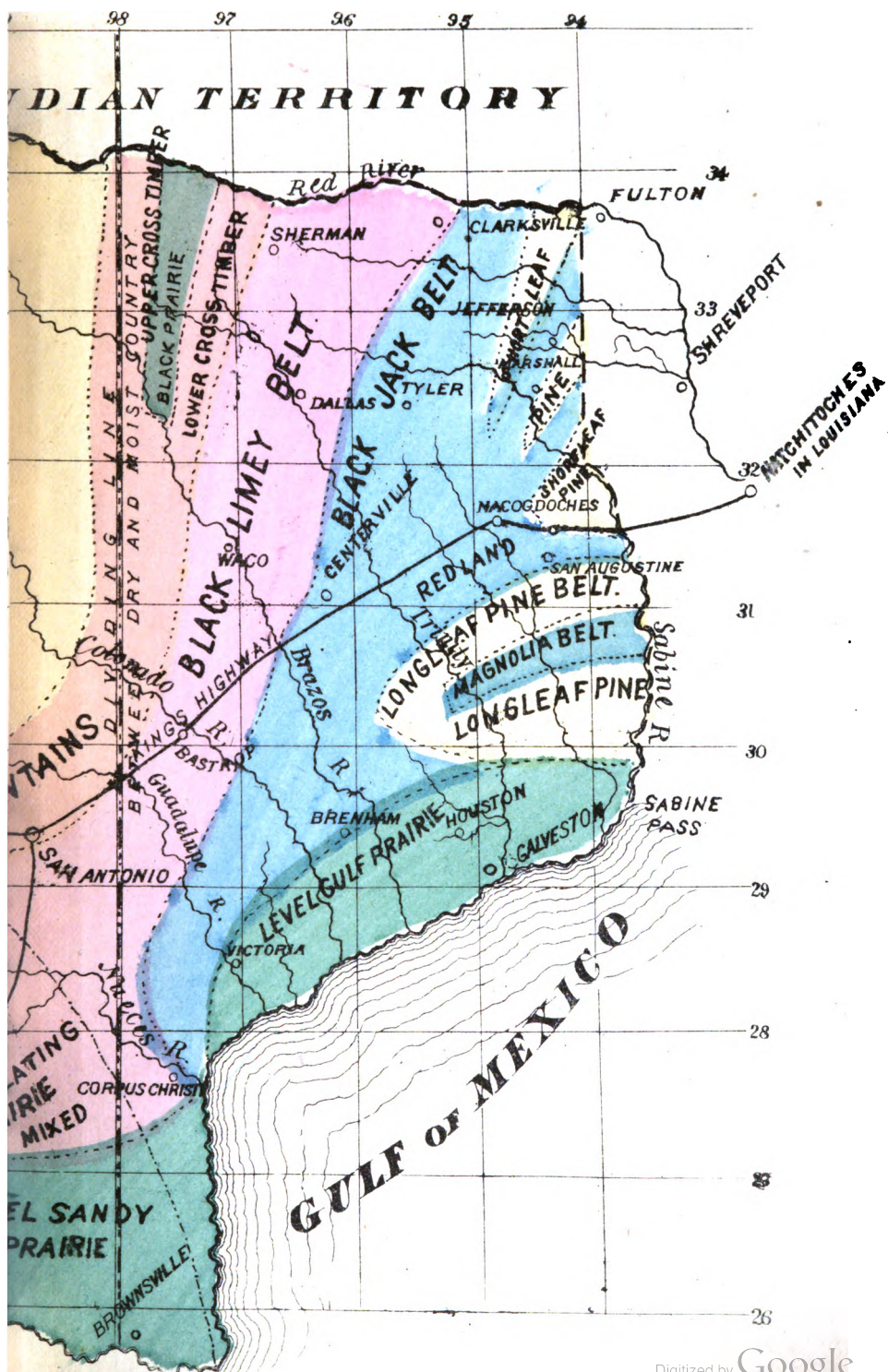
SABINE PASS

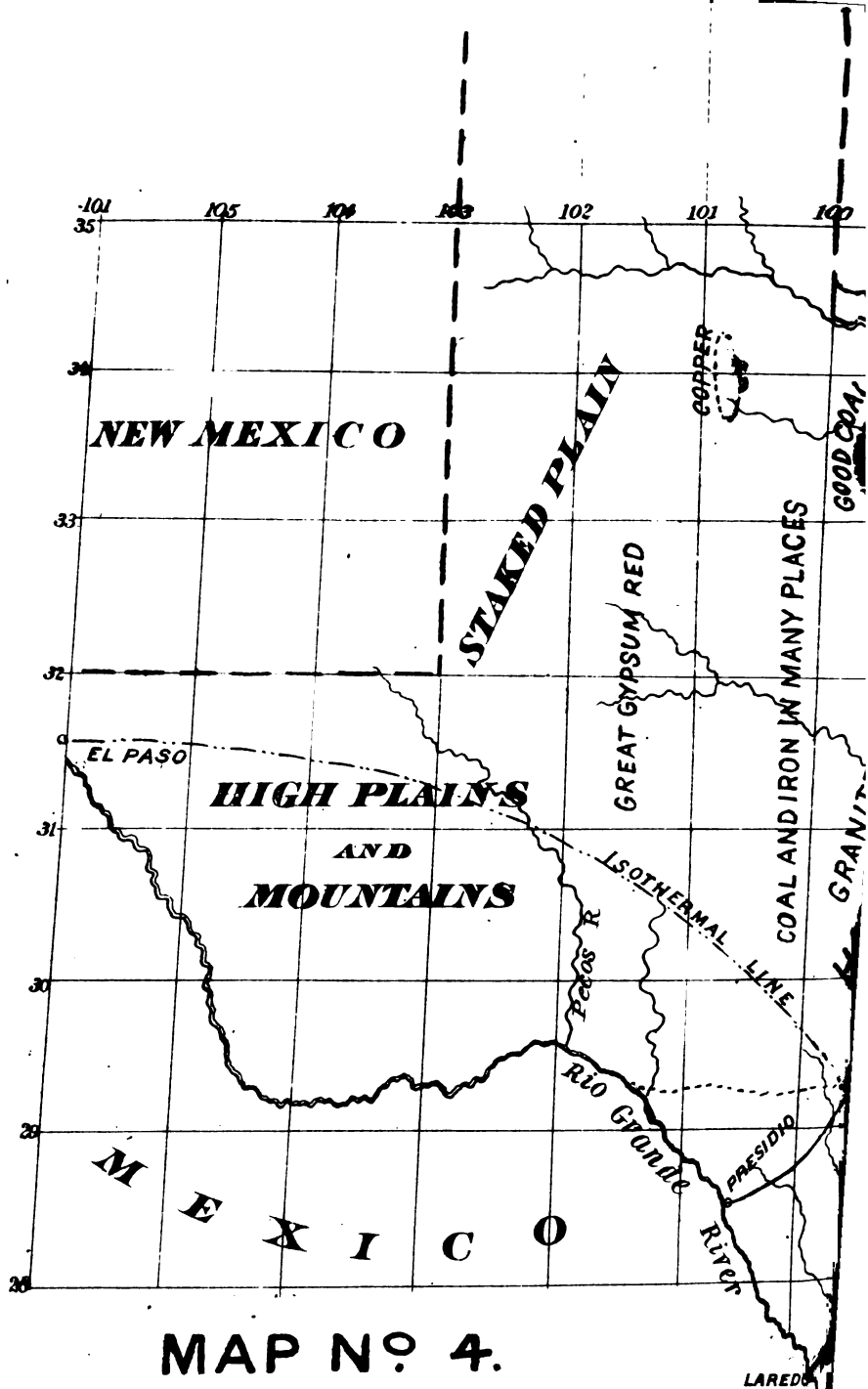
SHREVEPORT

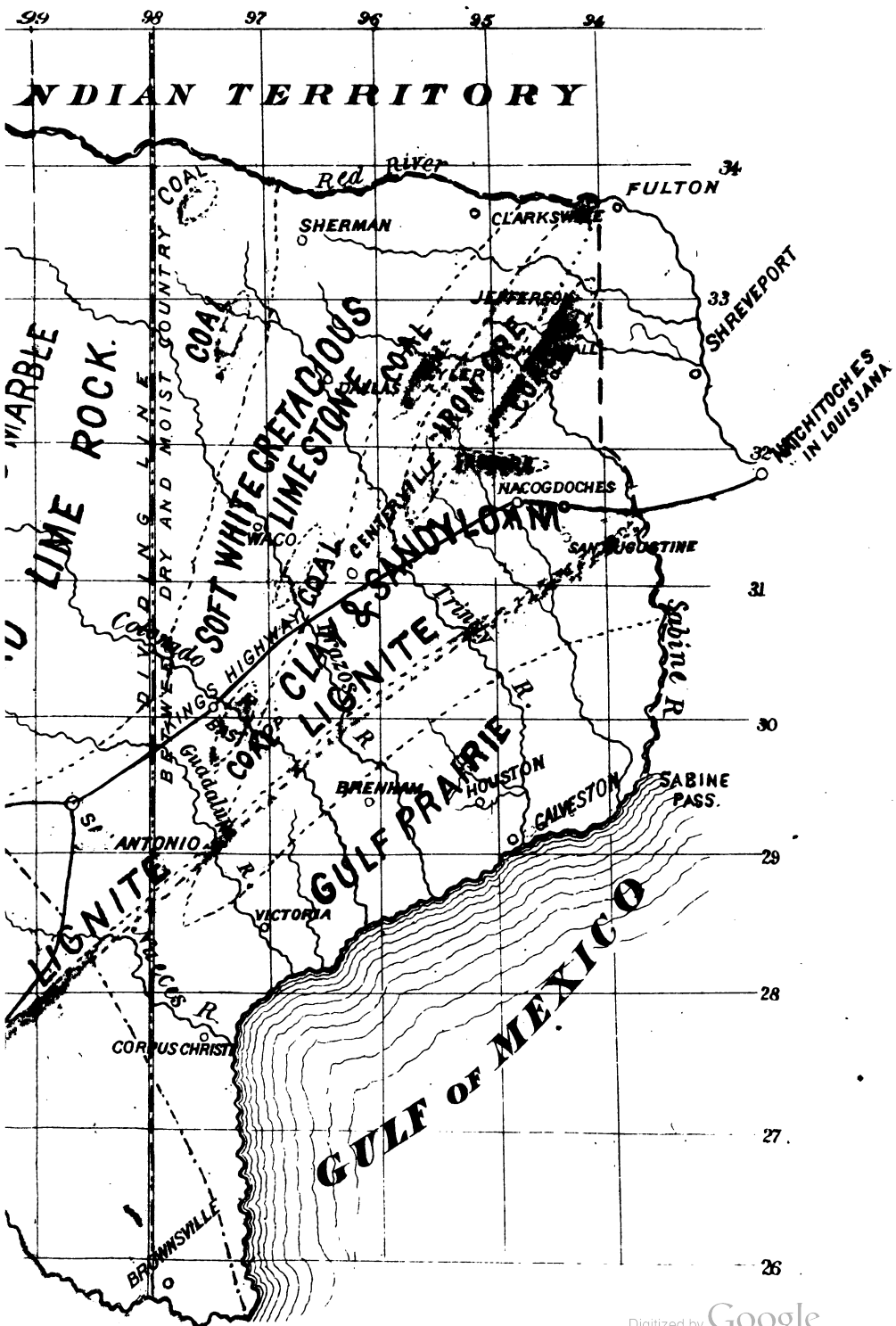
NATCHITOCHEES IN LOUISIANA

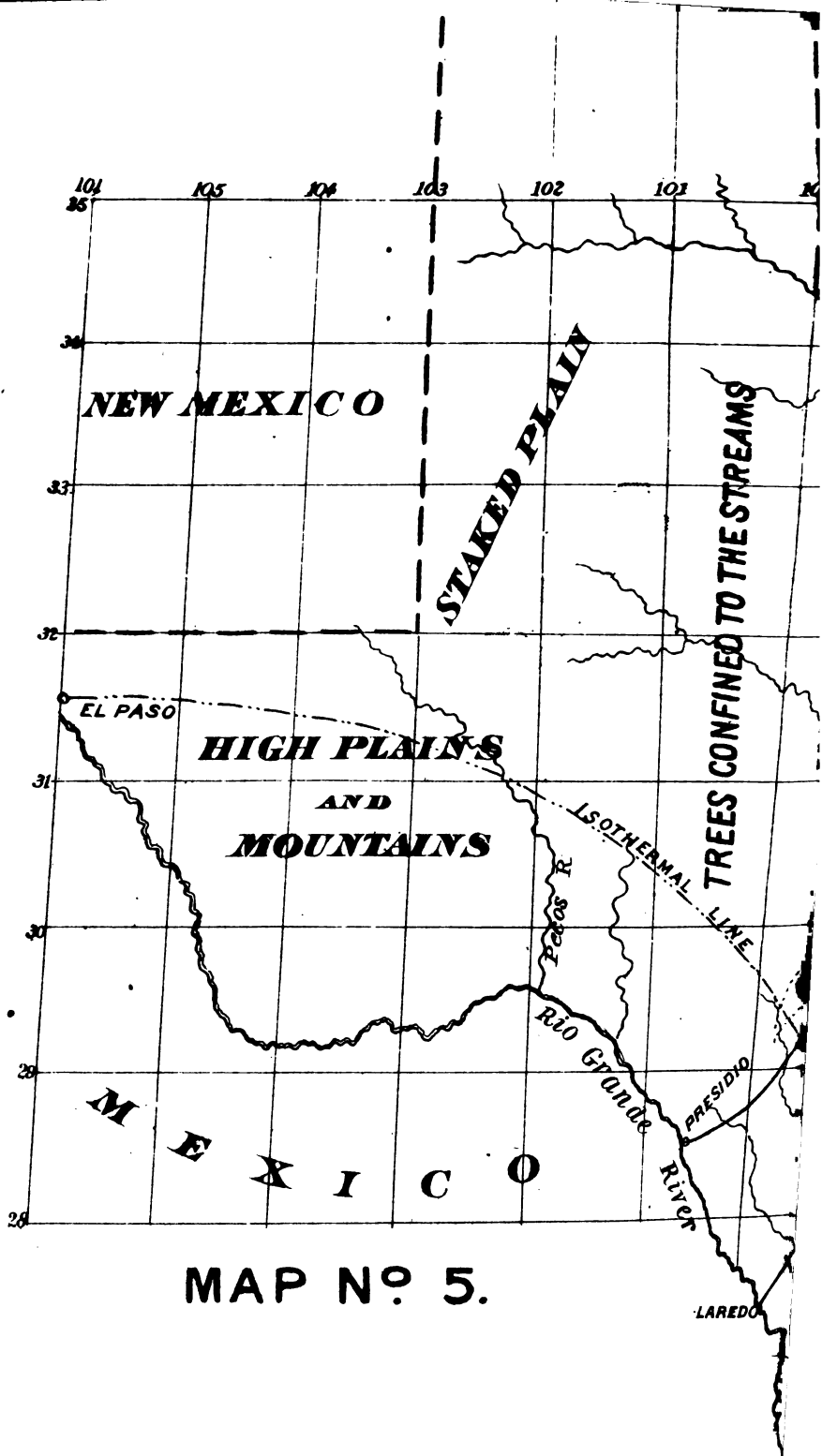


MAP No. 3.

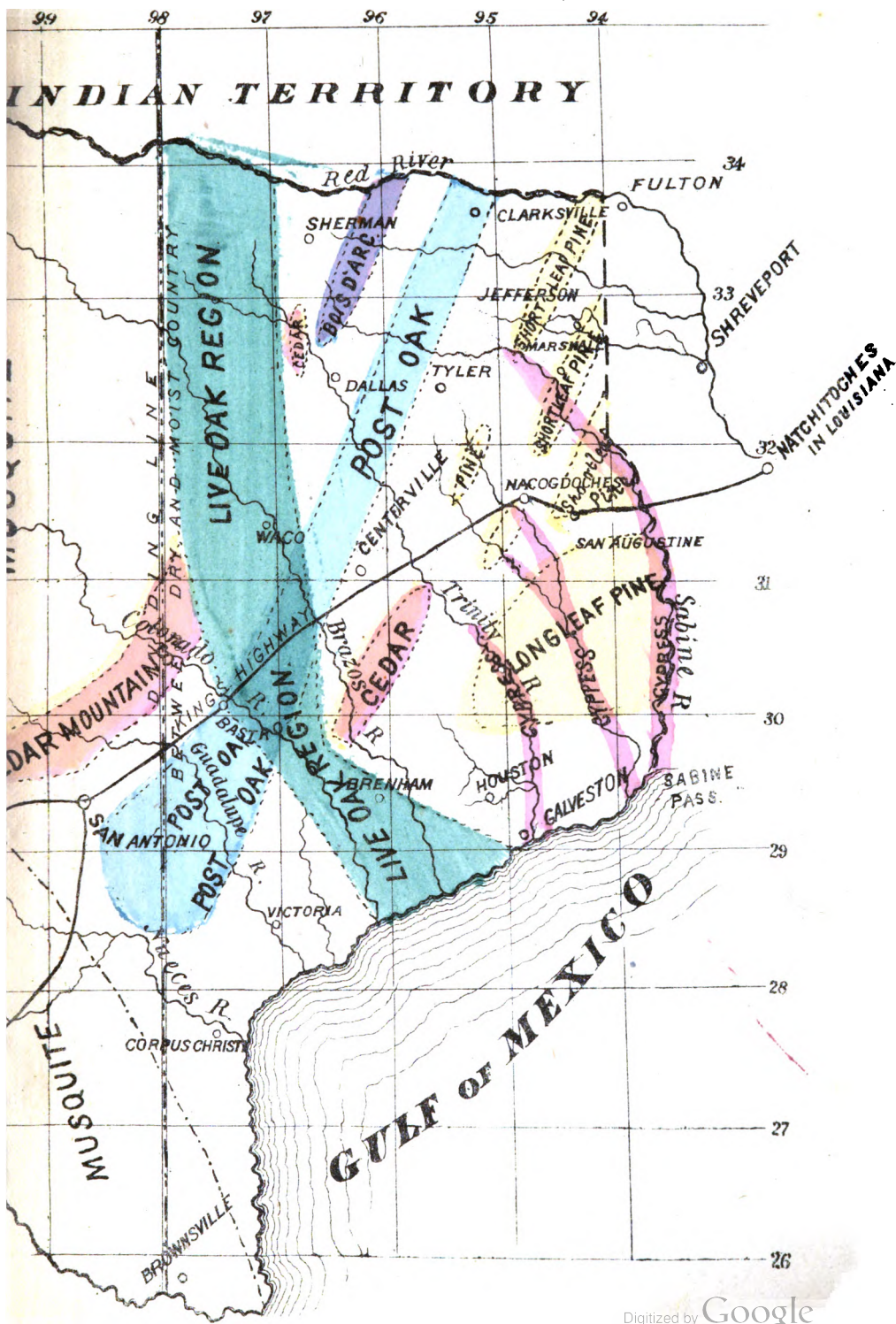








MAP N^o 5.





3 2044 014 714 729

DUE JUL. 2 1957

FEB 11 '57 H

~~STALL STUDY
CHANGE~~

